DUN'S REVIEW and Modern Industry

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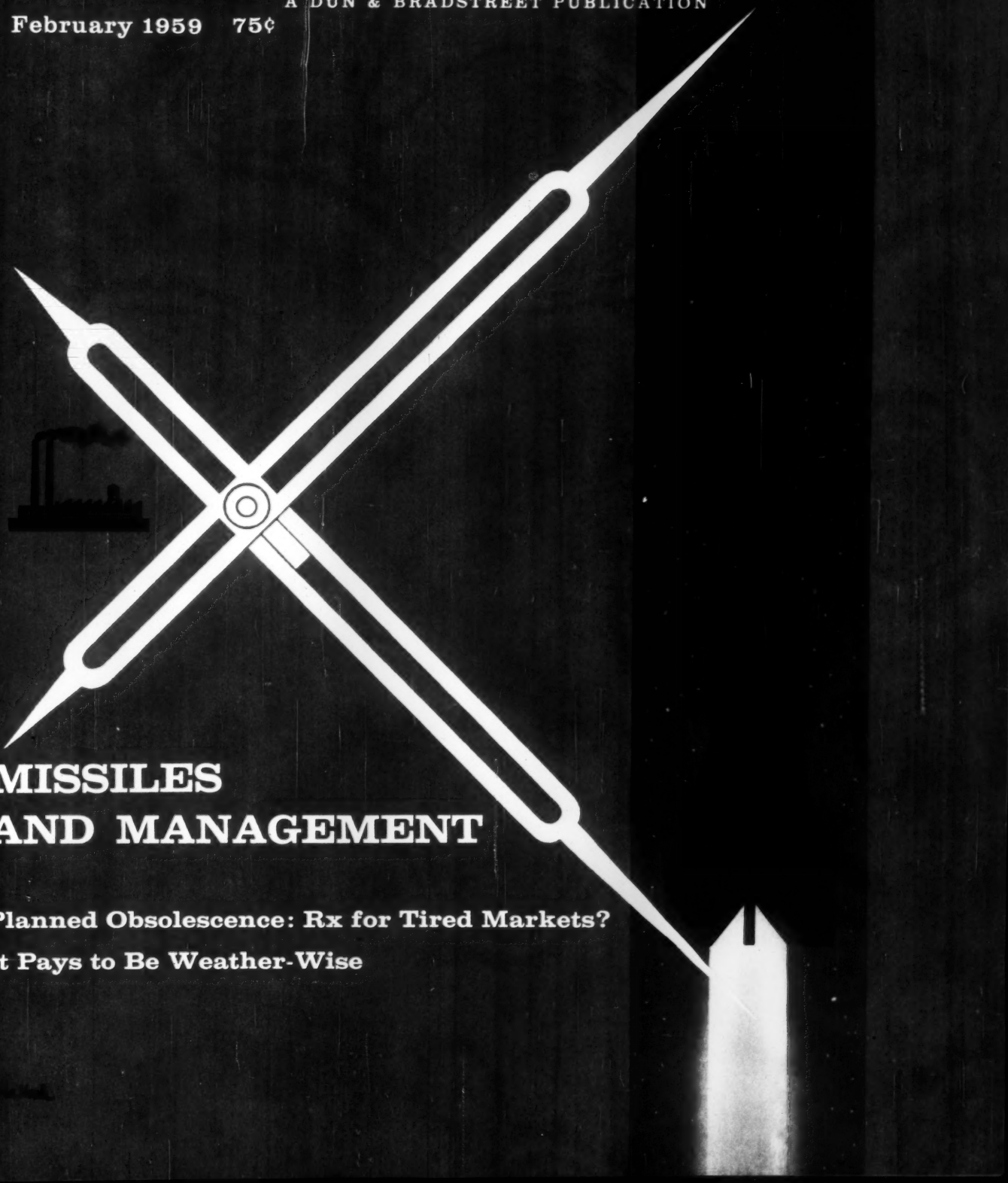
February 1959 75¢



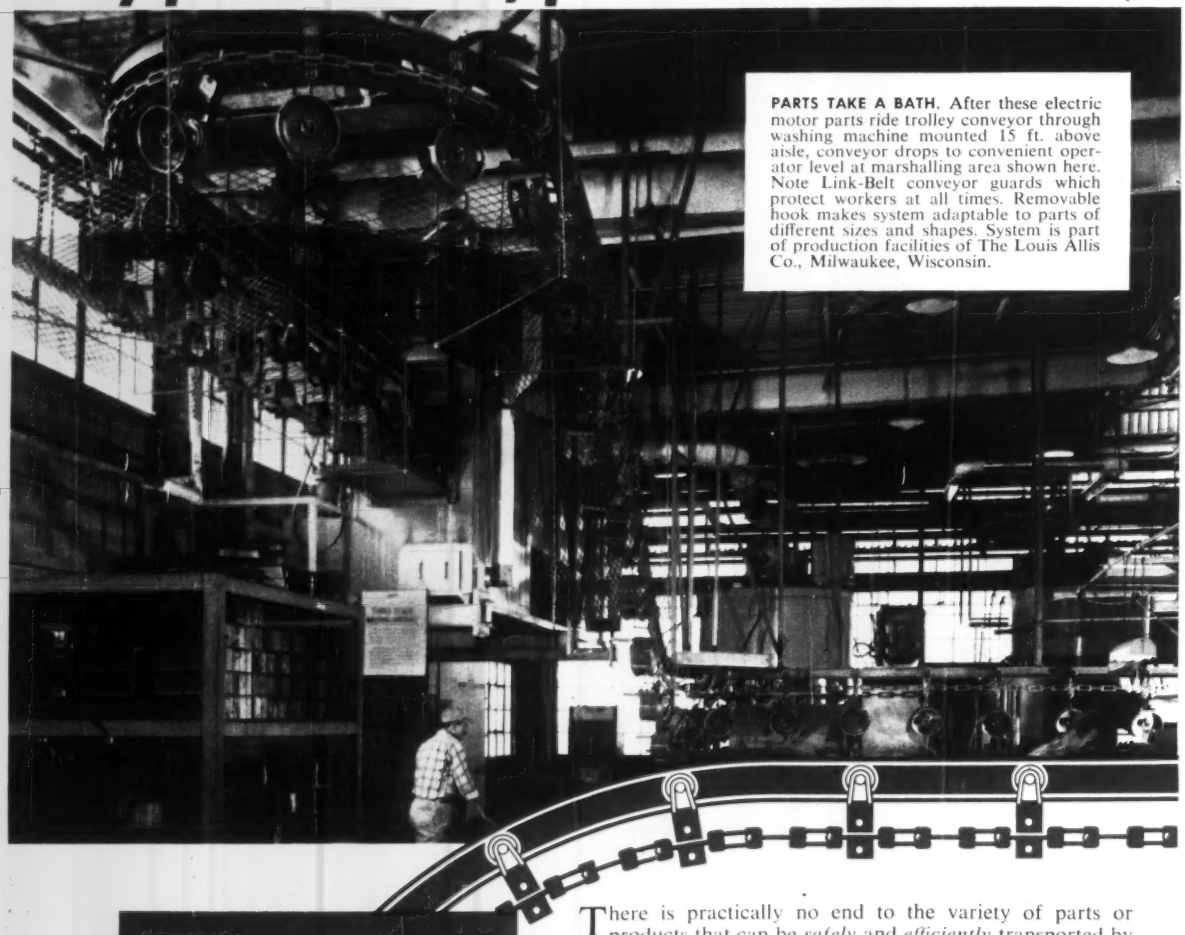
MISSILES AND MANAGEMENT

Planned Obsolescence: Rx for Tired Markets?

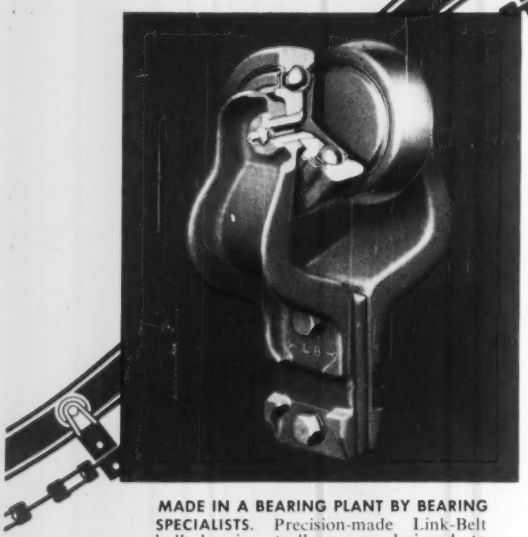
It Pays to Be Weather-Wise

LINK-BELT Trolley Conveyors . . .

carry parts above, protect workers below



PARTS TAKE A BATH. After these electric motor parts ride trolley conveyor through washing machine mounted 15 ft. above aisle, conveyor drops to convenient operator level at marshalling area shown here. Note Link-Belt conveyor guards which protect workers at all times. Removable hook makes system adaptable to parts of different sizes and shapes. System is part of production facilities of The Louis Allis Co., Milwaukee, Wisconsin.



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Editorial

The Liberal in Business

CAN a business man be a liberal?

Why not? The roots of trade are in the liberal tradition. Commerce led Europe out of the feudal shadows of the Middle Ages. The rise of the common man paralleled the enterprise of the commercial traveler in Europe. Practically every American colony was a business venture underwritten by men with a view to monetary reward. There were social, political, and religious freedoms involved in these enterprises, but the hopes of their leaders rested heavily on the support of risk capital.

The trouble with the word "liberal" is the selective way it is used by many people. In a narrow sense, it means the nonconformist who is opposed to the traditional, the conservative, and the obvious. In its broader, more acceptable definition, it identifies the man who applies reason and objectivity to any situation, regardless of popular bias. This kind of "liberal" detaches himself from any historical, preconceived attitudes toward a political, social, or business issue and reserves judgment until all the facts are in.

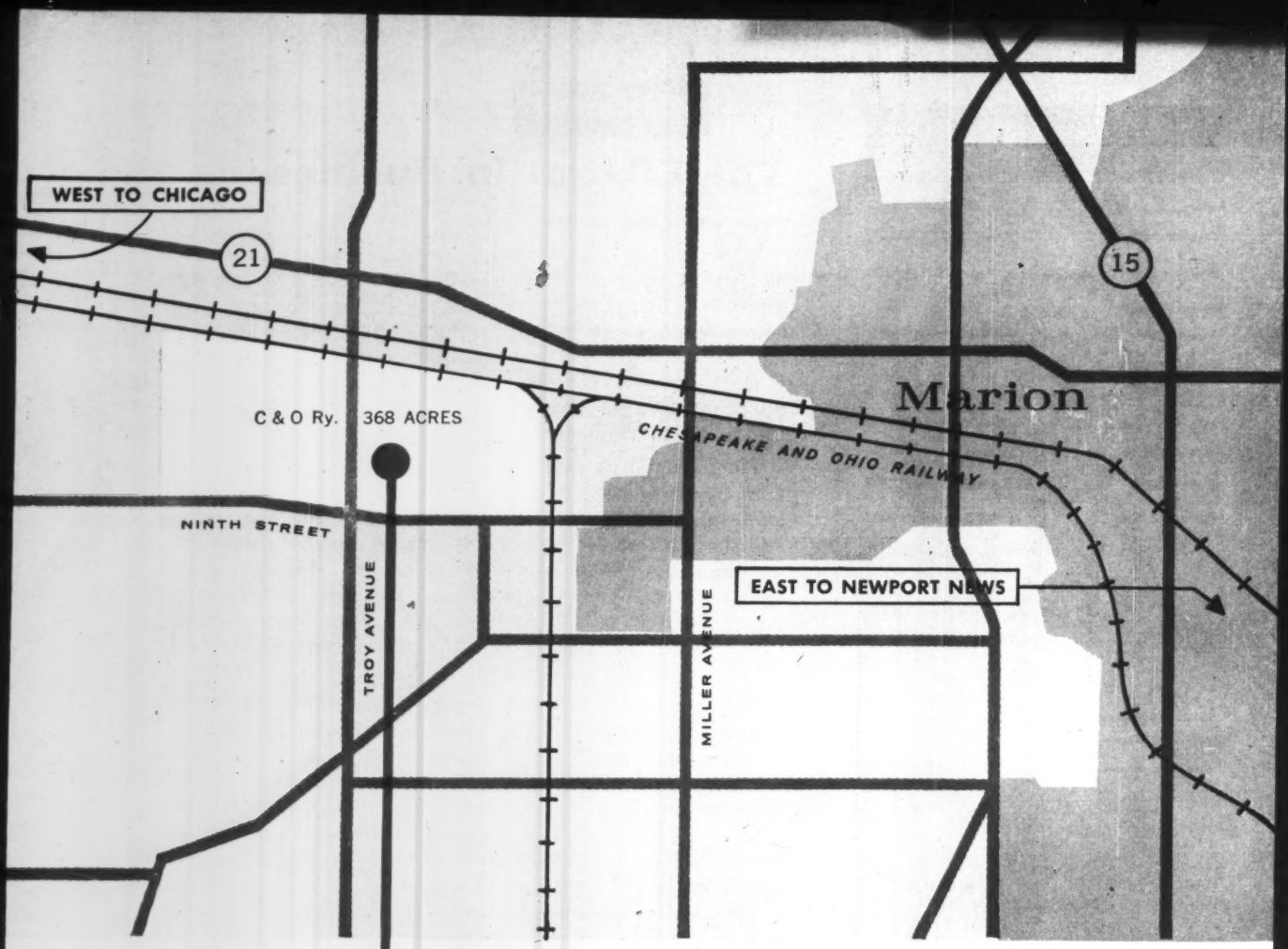
For instance, the American business man is liberal when he is willing to recognize potential merit in the foreign trader's ideas, products, and techniques, even though they may be new to him and not always easy to accept. He is liberal when he makes intelligent allowance for the language, customs, and methods of overseas customers or competitors. He is liberal when he withdraws from the heat of a front-line bargaining battle with union leaders to take a larger look at the whole arena and consider all parties to the outcome—white-collar, blue-collar, stockholder, and customer.

The liberal starts with the premise that not every issue in life is black and white and not every quarrel is between the "good guys" and the "bad guys." He knows that some disagreements are the result of honest differences of opinion, and he is willing to look at all sides. A liberal knows, too, that an agreement without good will, like a contract without mutual exchange of values, is a contradiction in terms.

The liberal business man keeps informed of the political and social progress of his community. He recognizes the need for order in the affairs of business and the reasonableness of regulatory law, but he is just as alert to take action when his rights and those of his competitors are unfairly restricted. The liberal never says, "I'm staying out of politics." He knows his responsibility as a citizen and never sidesteps it.

The liberal in business respects the courage of any honest opponent, whether labor leader or competitor, but he never sacrifices principle for momentary advantage. If there are two sides to a question, he tries to find the right side and stay off the fence. He is liberal enough to know that all ideas, things, and people have dimensions and limitations, and there comes a time when principles have to be defined and accepted. No man is liberal who attempts to be all things to all people—not even in business when profits are at stake.

The Editors



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Complete Industrial Surveys of this and other Indiana sites are available to interested companies. Inquiries are handled in complete confidence and without obligation. Address: Wayne C. Fletcher, Director of Industrial Development, Chesapeake and Ohio Railway, Huntington, West Virginia. Tel.: Jackson 3-8573.

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The Trend of Business

An action report on the U.S. economy

Soft Spots Slow Recovery

Outlook in Brief . . .

PRODUCTION: ***Pre-recession peaks will be matched in coming months***

SALES: ***Continued but not sharp year-to-year gains at retail***

UNEMPLOYMENT: ***Relatively high levels will persist in the first half***

HOUSING: ***Starts will begin to edge downward as costs increase***

PROFITS: ***Corporate profits will be up noticeably over 1958***

ALTHOUGH over-all business conditions will continue to improve in the coming months, the prospects are that a few remaining soft spots will somewhat restrain the rate of recovery.

While unemployment will gradually decrease during the first half of the year, it will remain substantially above pre-recession levels. The number of employed will move up steadily in the coming months. Consumer buying will continue to gain on a year-to-year basis, but relatively high unemployment will prevent any sharp increases, and a slight rise in prices will make shoppers more selective. Higher costs and a tightening in mortgage money will hold the number of housing starts at current levels until about mid-year, when a slight downturn is in prospect.

On the brighter side, industrial production will steadily rise, matching pre-recession peaks during the first quarter. Increases in manufacturers' new orders, especially in durable goods, and a cautious but steady climb in over-all business inventories, will be responsible for these gains.

Encouraged by rising profits and anticipating further increases in orders, business men will probably take action to expand their production facilities. Some moderate gains in outlays for new plants and equipment will occur, but there will be no marked rise until sometime early in 1960.

Although caution is likely to remain the by-word, business men in many industries will noticeably build up their steel inventories during the next few months. Steel producers expect the most significant gains in new orders from the automotive, farm implements, construction, freight car, and appliance industries.

To accommodate this upturn in bookings, steel mills will schedule operations at about 80 per cent of rated capacity for the rest of 1959's first half. Prospects after that depend on the outcome of contract negotiations in the industry.

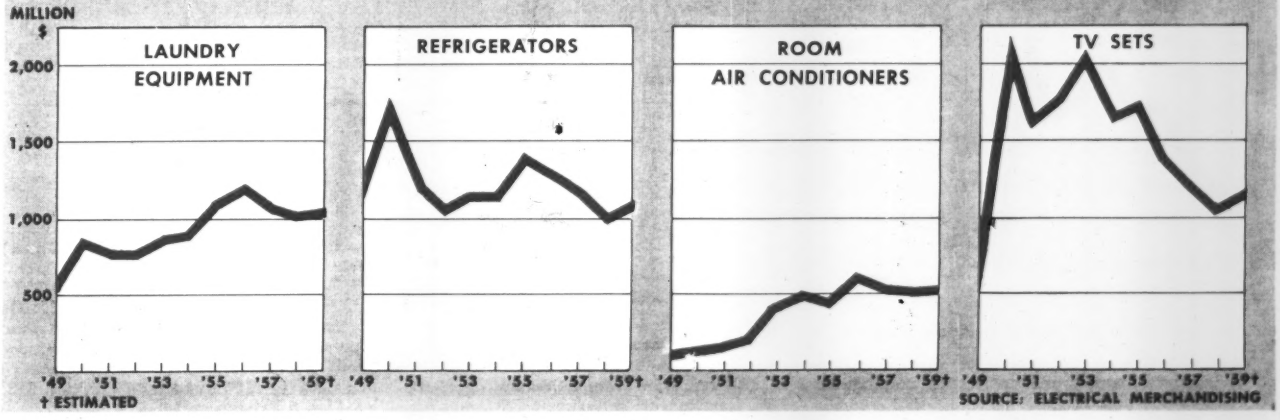
Although labor difficulties may tend to slow down oil output during the coming months, production will remain close to or slightly above year-earlier levels. Industry officials anticipate an appreciable rise in oil demand and a slight increase in prices.

After spending $1.2 billion in 1958 for new equipment and construction, the steel industry plans to lay out another $1 billion for expansion in 1959, according to the American Iron and Steel Institute. Last year's increase in spending boosted annual steel-making capacity to a record 147.6 million tons, more than twice that of any other nation. Capacity in 1958 rose almost 7 million tons. Since World War II, the industry's outlays for expansion have amounted to more than $11 billion.

Moderate year-to-year gains will continue to prevail in electric power production, and output in 1959 as a whole will be at new peak levels. Coal production will remain close to 1958 levels through next June. The noticeable rise in paperboard output that occurred at the end of 1958 will persist through most of the current year, and production will climb to a new high for the year as a whole.

The marked improvement in sales of new passenger cars has led producers to boost first-quarter output schedules

Retail Appliance Sales . . . IN MILLIONS OF DOLLARS



sharply over the 1958 level. Output for the rest of the year will depend on whether favorable consumer response to the 1959 models persists. Most producers expect new car sales in 1959 to be somewhere between 5.5 and 6.0 million. They also believe that the recent rise in imports of small foreign models will slacken for the rest of the year.

An increase in manufacturers' sales and new orders will spur a steady rise in total industrial output. The rise in orders from the durable goods industries will be greater than from the makers of nondurables. The sales-stock ratio (or amount of goods on hand in relation to current sales) will remain at year-earlier levels, another stimulant to increased production.

Much of the increase in manufacturers' orders will be centered in the appliance, furniture, and housewares industries. There will be appreciable year-to-year gains in both dollar and unit volume. The month-to-month increases in nondurable goods will be less marked than in durables, but the current gains over year-earlier levels will remain.

As manufacturers step up production schedules, they will be more likely to hire new workers than to pay overtime rates to their present workforce. This will help send employment climbing

28 Compass Points of Business

	1. Employment—nonagricultural (in millions)	2. Unemployment (millions)	3. Consumers' Price Index 1947–49=100	4. Wholesale Price Index 1947–49=100	5. Industrial Stock Price Averages (in $)	6. Weekly Hours—Industrial Workers (Hours)	7. Weekly Earnings—Industrial Workers (in $)	8. Disposable Personal Income (billion $)	9. Disposable Income—Per Capita (1957 $)	10. Corporate Profit—After Taxes (billion $)	11. Industrial Production—Physical (Index)	12. Building Permits—120 Cities (million $)	13. Plant and Equipment Expenditures (billion $)	14. Gross National Product (billion $)
'58 IV	**59.0**	**4.0**	**123.9**	**119.1**	**554.06**	**39.9**	**86.53**	**315.4●**	**1,759●**	**20.8**	**141***	**1,226**	**29.9●**	**453.0●**
'58 III	58.6	4.7	123.8	119.1	505.88	39.6	84.41	314.0●	1,748●	18.0	136*	1,509	29.6●	439.0●
'58 II	57.7	5.1	123.6	119.3	459.64	38.7	81.98	307.5●	1,723●	15.7	129*	1,555	30.3●	429.0●
'58 I	57.2	4.9	122.7	119.2	446.66	38.6	81.25	305.0●	1,726●	15.5	130*	1,144	32.4●	425.8●
1958	58.1	4.7	123.5	119.2	491.56	39.2	83.54	310.6	1,729	17.5	134	5,434	30.5	436.7
1957	58.8	2.9	120.2	117.6	475.67	39.8	82.39	305.1	1,782	21.8	143	4,722	37.0	440.3
1956	58.1	2.8	116.2	114.3	493.01	40.4	79.99	290.5	1,786	23.1	143	4,826	35.1	419.2
1955	56.3	2.9	114.5	110.7	442.70	40.7	76.52	274.4	1,743	23.0	139	4,571	28.7	397.5
1954	54.4	3.6	114.8	110.2	333.91	39.7	71.86	256.9	1,657	16.8	125	4,143	26.8	363.1
1953	55.4	1.9	114.4	110.1	275.96	40.5	71.69	252.5	1,662	18.1	134	4,034	28.3	365.4
1950	52.5	3.1	102.8	103.1	216.31	40.5	59.33	207.7	1,591	22.8	112	4,466	20.6	285.1
1949	50.7	3.4	101.8	99.2	179.48	39.2	54.92	189.7	1,501	16.0	97	3,131	19.3	258.1
1948	51.4	2.1	102.8	104.4	179.95	40.1	54.14	189.3	1,510	20.5	104	3,111	22.1	259.4
1939	35.6	9.5	59.4	50.1	142.66	37.7	23.86	70.4	1,089	5.0	58	1,029	5.5	91.1
1932	28.0	12.1	58.4	42.8	64.57	38.3	17.05	48.7	776	—3.4	31	336	2.6	58.5
1929	36.1	1.5	73.3	61.9	311.24	44.2	25.03	83.1	1,081	8.3	59	2,490	9.2	104.4

	15. Farm Receipts (billion $)	16. Exports (million $)	17. Imports (million $)	18. Retail Sales (million $)	19. Wholesale Sales (million $)	20. Manufacturing Sales (million $)	21. Total Business Inventories (million $)	22. Federal Receipts (billion $)	23. Federal Spending (billion $)	24. Gross Federal Debt (billion $)	25. Consumer Credit Outstanding (billion $)	26. Loans of Commercial Banks (billion $)	27. Deposits and Currency (billion $)	28. Interest on Business Loans (percentage)
'58 IV	**8.0**	**4,300**	**3,200**	55,739	37,300	**83,000**	**85,767**	**12.7**	**19.0**	**284.0**	**43.7**	**95.0**	**139.0**	**4.25**
'58 III	9.5	4,177	3,119	49,922	33,500	79,500	85,433	15.0	19.4	276.8	43.1	94.2	135.8	4.21
'58 II	7.0	4,577	3,157	50,240	32,300	75,800	86,967	19.2	18.6	276.4	43.1	95.6	134.1	4.17
'58 I	7.1	4,413	3,129	44,168	31,500	76,800	89,267	20.6	17.3	272.7	42.5	93.0	133.3	4.49
1958	31.6	17,467	12,605	200,519	134,600	315,100	85,767	67.5	74.3	284.0	43.7	95.0	135.6	4.25
1957	29.8	20,810	12,978	200,001	135,200	340,600	89,600	72.3	71.6	275.0	44.8	93.9	138.6	4.85
1956	30.5	19,090	12,615	189,729	135,300	332,500	87,800	71.0	67.1	276.7	42.1	90.3	139.7	4.38
1955	29.5	15,547	11,384	183,851	127,400	316,100	80,300	63.3	66.1	280.8	38.7	82.6	138.2	3.93
1954	30.0	15,106	10,215	169,135	116,800	282,400	74,300	60.5	64.5	278.8	32.3	70.6	134.4	3.55
1953	31.4	15,774	10,873	169,094	117,700	294,200	77,300	64.2	73.3	275.2	31.2	67.6	130.6	3.69
1950	28.7	10,275	8,852	143,689†	101,000	231,400	62,000	37.8	38.3	256.7	21.4	52.2	117.7	2.70
1949	28.1	12,051	6,622	130,721	86,600	197,000	51,100	38.1	41.7	257.2	17.3	43.0	110.0	2.70
1948	30.5	12,653	7,124	130,521	90,600	211,600	54,700	41.5	36.2	252.9	14.4	42.5	111.6	2.50
1939	8.6	3,177	2,318	41,042	26,244†	61,340	19,876	4.9	8.9	47.7	7.2	17.2	36.2	2.10
1932	4.7	1,611	1,323	25,013	...	30,774	...	6.9	4.7	19.5	3.6	21.8	20.4	4.71
1929	11.3	5,241	4,399	48,459	37,814	70,262	24,097	3.9	3.1	16.9	6.4	35.7	26.4	5.83

●Annual rate seasonally adjusted.

*Quarterly figures seasonally adjusted.

†Figures for this and prior years are from another source and not strictly comparable with later data.

Fourth quarter 1958 and Year 1958 figures for most series are based upon preliminary estimates and incomplete data.

SOURCES: Dow Jones & Company, *Series 5;* **U.S. Government:** Department of Commerce, *1, 2, 8, 9, 10, 14, 16, 17, 18, 19, 20, 21*; Department of Labor, *3, 4, 5, 6, 7*; Treasury Department, *22, 23, 24*; Federal Reserve Bank, *11, 25, 26, 27, 28*; Department of Agriculture, *15*; Commerce Dept. and SEC, *13*; **Dun & Bradstreet, Inc.,** *12.*

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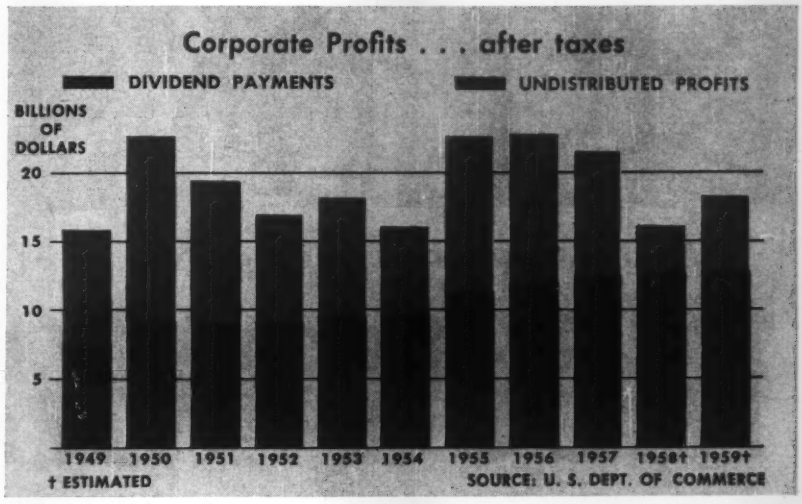

PROFITS ON THE RISE: *A steady rise in sales and increased efforts to cut costs will help boost corporate profits this year noticeably over 1958, but a record level is unlikely.*

steadily to record levels toward year's end. But, since the labor force will continue to grow, this increase will not be sufficient to bring about a marked decline in unemployment.

With more people at work, wage and salary disbursements will climb, holding personal income at peak levels during the second quarter. Increased durable goods manufacturing payrolls, higher wage rates, and an increase in average hours worked will account for much of the rise.

Consumers remain cautious

Although higher income and employment levels will boost retail trade in the coming months, year-to-year gains will not be sharp. Consumers will still be somewhat influenced by lingering memories of the recession, not-so-optimistic reports on unemployment, and slightly rising prices in some lines.

Month-to-month increases will be most noticeable in household goods. Sales of major appliances, especially automatic laundry equipment, dishwashers, refrigerators, and television sets, will start edging past 1958 levels in the next few weeks. Furniture volume will continue to widen the year-to-year gains that were resumed late in 1958.

Although an early Easter selling season this year probably will hurt apparel sales, volume will remain slightly better than in the comparable period last year. Shoppers will be primarily in the market for women's Spring suits, dresses, and fashion accessories.

Grocers can expect a continued record level of food sales in the next few months. Although canned goods sales will be down somewhat in the next few weeks, volume will pick up appreciably as prices slip. Substantial year-to-year gains in frozen foods are expected to continue.

The recent pick-up in consumer installment buying will be sustained through the first half of this year. Higher spending for big-ticket household items and new passenger cars also will cut moderately into the volume of individual savings.

In anticipation of a better-than-ever Easter selling season, buyers' orders at January apparel showings were noticeably larger than in 1958. Many retailers, caught with limited stocks of women's merchandise during the Christmas season, are showing a little less restraint in ordering Spring clothing. These year-to-year gains will be sustained through the first half of 1959, as more Spring merchandise reaches the wholesale centers and Summer clothing is introduced.

Low inventories at all levels will continue to spark textile activity. Trading in cotton gray goods, wide industrial fabrics, and man-made fibers will move up steadily. Most wholesalers anticipate substantial yearly gains in 1959.

Brighter outlook for wholesalers

The next few weeks will see year-to-year gains in wholesale sales of most major appliances and furniture. Best sellers should be television sets, dishwashers, metal dinette sets, and outdoor lawn furniture.

Although changes in wholesale and consumer prices will be minor for the rest of the year, the general trend will be toward fractional increases. Lower food prices at both wholesale and retail levels will offset any noticeable rises in costs of services, transportation, apparel, and household goods. But retail buyers and consumers can expect a resumption of a creeping type of inflation

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during the second half of the year and even more noticeable price rises in 1960.

Behind this rising trend in prices will be limited stocks and higher demand in many lines, increased labor costs among manufacturers, and the financing of Government spending through commercial banks.

Dollar outlays for construction in 1959 are sure to set a new record, but the physical volume will not yet reach the record set in 1955. As in the past three years, higher building costs will account for most of the increase in dollar outlays.

Public funds spur building

Public spending will again be responsible for much of the boost in construction expenditures. The biggest part of this spending will be increased outlays by the Federal, state and local governments for road building. More money will also be spent on school building.

Business will spend substantially more this year than last for commercial and industrial buildings. Outlays for business construction were down noticeably in 1958, but were offset by the gains in public spending and home building. This year, the outlook for home building is dimmed by the return of tight mortgage conditions, which will discourage many prospective buyers.

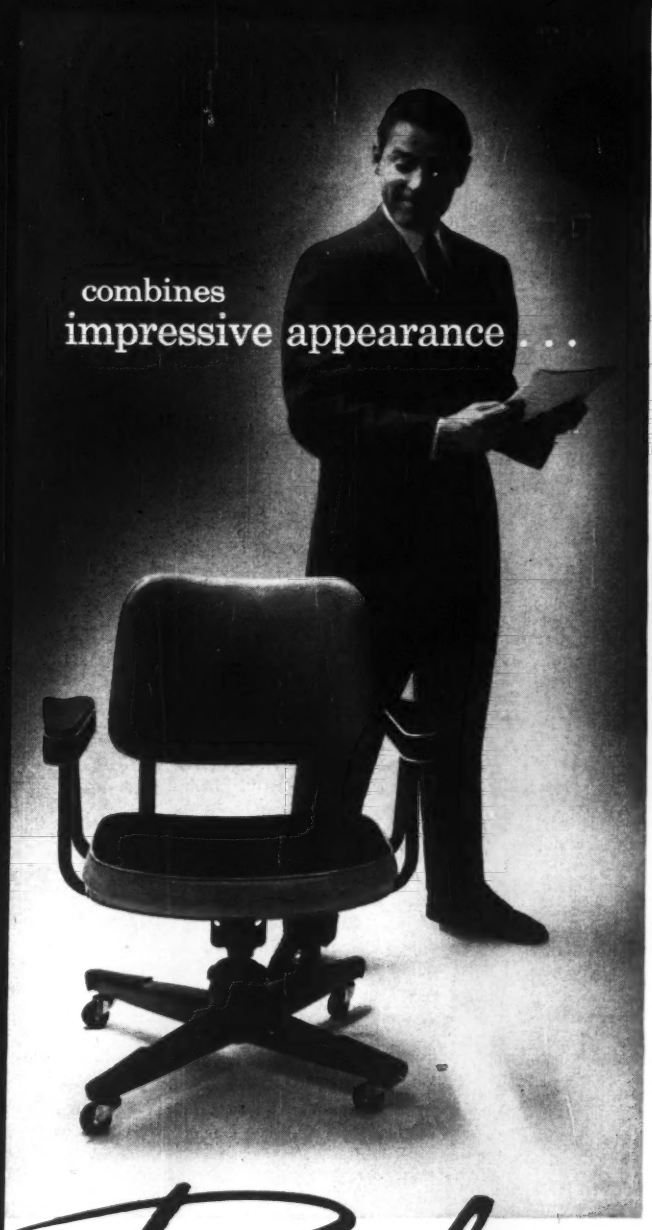
There will be a continued rise in modernization and repair work this year, but the rate of increase will be less pronounced than in 1958. Last year, many business men decided to renovate existing structures rather than build new ones. This year, however, many will be planning new installations.

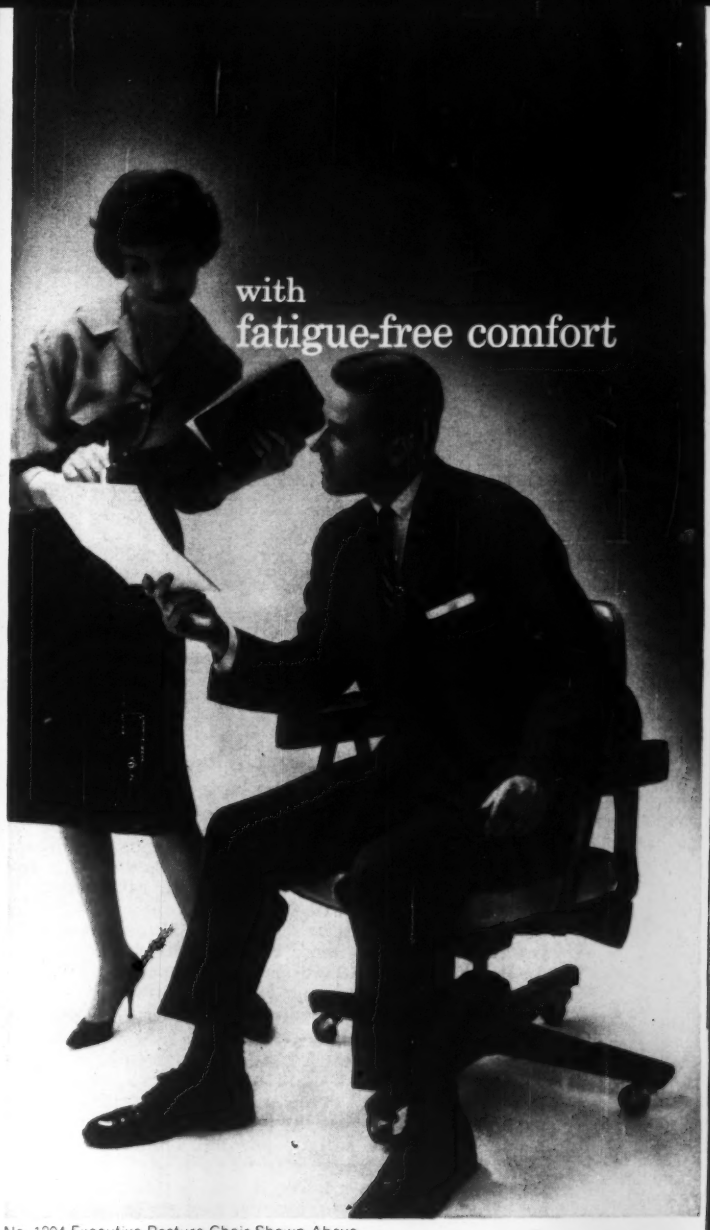
Farmers will not be quite so well off this year as they were in 1958. Last year, the net income of farmers was about 20 per cent higher than the previous year and was at the highest level in five years. This year, the costs of production will be higher, and record

Weekly Business Signposts

	Latest week	Previous week	Year ago
Steel ingot production. . Ten thousand tons (a)	215	211	150
Electric power output. . Ten million KW hours (b)	133	136	124
Bituminous coal mined. Hundred thousand tons (c)	83	82	85
Automobile production. Thousand cars and trucks (d)	156	156	128
Department store sales. Index 1947–1949 = 100 (e)	116	121	110
Bank clearings, 26 cities Hundred million dollars (f)	26.3	24.9	23.5
Business failures. . . . . Number of failures (f)	294	321	260

SOURCES: (a) Amer. Iron & Steel Inst.; (b) Edison Electric Inst.; (c) U.S. Bureau of Mines; (d) *Automotive News*; (e) U.S. Bureau of Labor Statistics; (f) DUN & BRADSTREET, INC. Steel data, for the fourth week of January; failures for the second week; all others for the third week.





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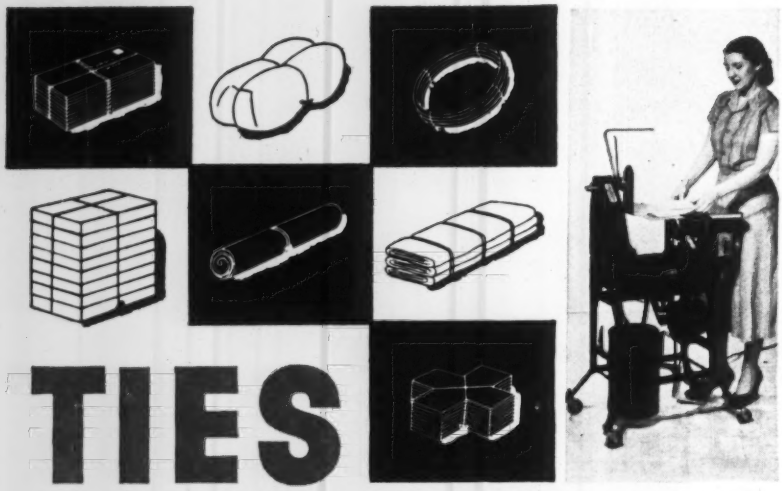

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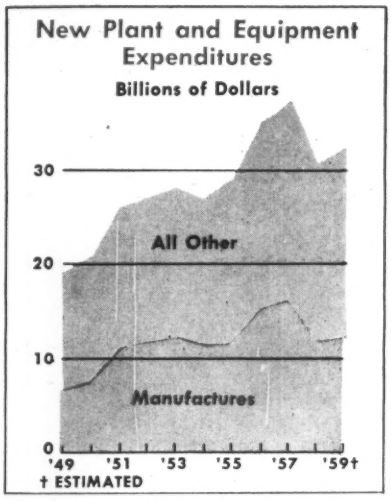


PLANT OUTLAYS EDGE UP: *A slight increase in capital expenditures is in prospect for 1959. Source: Securities and Exchange Commission.*

crops will mean lower farm prices. The decline in prices which began in the closing months of 1958 will continue in the coming months.

The value of farm assets in 1958 was the highest on record, and this level is likely to be matched this year, despite the clip in net income. By the end of 1958, credit extended to farmers for enlarging operating units had risen 5.5 per cent in five years. This trend will continue in 1959, but the rate of increase will slacken somewhat.

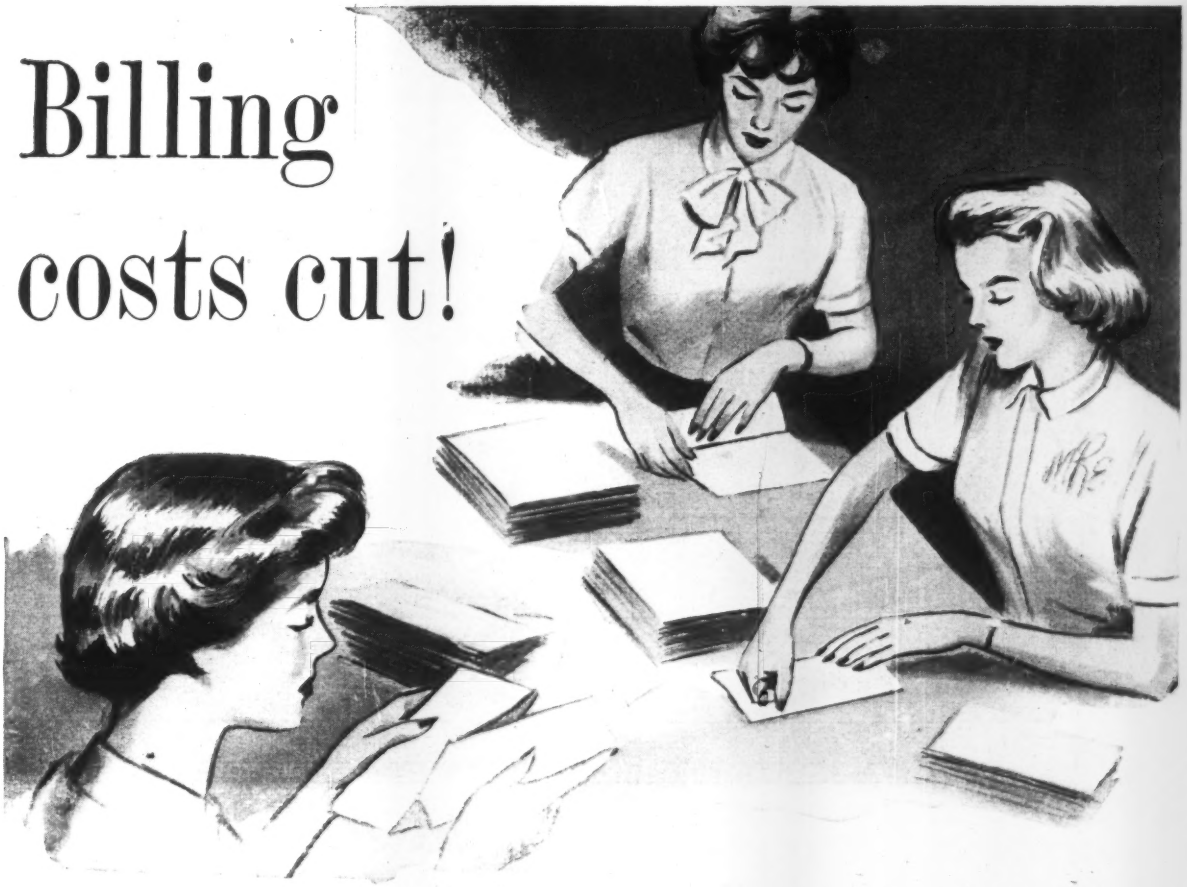
Bank profits hit peak

Preliminary reports indicate that bank profits edged up in 1958 to a record level. The increase was attributed to higher income from investments, especially from sharply increased holdings of U.S. Government securities. This offset the moderate decrease in income from loans caused by lower loan volume and lower interest rates. There also was a moderate rise in bank operating expenses during the year. A boost in loan volume is in prospect for 1959. This, along with a further increase in income from investments, will mean another record year for bank earnings.

The twelve Federal Reserve Banks reported that their earnings in 1958 were down about 3 per cent from the previous year. The decline was attributed primarily to increased expenses and lower earnings from loans to member banks.

These reports of record over-all bank earnings helped push stock prices to record levels in early January. Other influences were favorable forecasts for 1959 general business conditions, especially in the automotive and railroad industries.

Billing costs cut!



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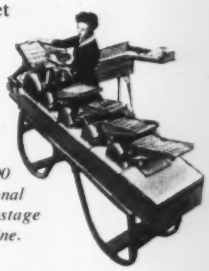

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Although the stock market will probably experience noticeable setbacks during the year, stock averages most likely will continue to hit new record levels in 1959.

Ike's 1960 budget

On January 19, President Eisenhower sent to Congress his fiscal 1960 budget for the year ending June 30, 1960, proposing budget receipts of $77.1 billion and expenditures of $77.0 billion. He stressed the importance of a balanced budget in keeping a check on inflation.

The President predicted that Federal revenues would rise as a result of higher personal income, rising corporate profits, and resultant higher tax receipts. The revenue estimates depend on the extension for another year of the 52 per cent corporate tax rate and current excise rates on automobiles, liquor, and tobacco. Also, there would be higher taxes on insurance companies, cooperatives, and certain mining processes, and higher first-class mail rates. Other sources of additional revenue would be an increase in the Federal tax on gasoline and a new tax on jet fuels as well as increases in the lending rates on certain Government loans.

Of the $77 billion expenditure total, $46 billion would be spent on major national security programs, with $41 billion for the Air Force, Army, and Navy, and the rest for atomic development, stockpiling, and military aid. An $800 million increase over 1959 was proposed for missile spending, while a small $145 million rise was outlined for the armed forces.

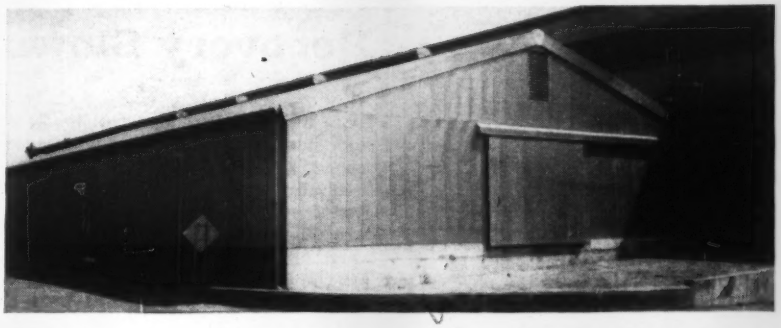
There would be cutbacks in expenditures for foreign aid, housing, and agriculture, while outlays for veterans' services and benefits, and labor and welfare would be about the same as in fiscal 1959.

The 1960 budget proposal provides for a budget surplus of about $70 million, compared with an estimated deficit of $12.9 billion for fiscal 1959. Current estimates indicate that budget expenditures in 1959 will amount to $80.9 billion, and receipts will come to $68.0 billion.

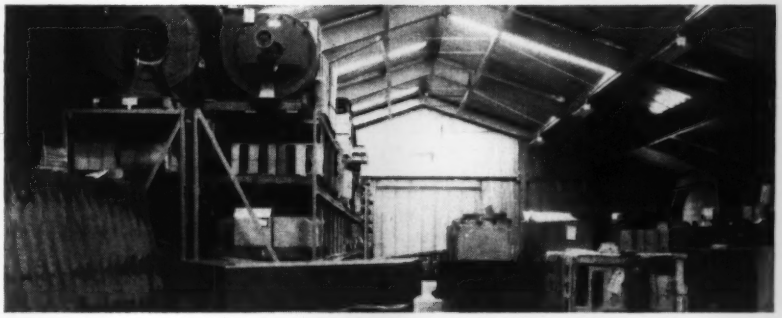
The proposal for 1960 represents the Administration's efforts to get the Government out of the red after two bad deficit years—but final action, of course, rests with a Democratic Congress. Many lawmakers and others find the revenue estimates too optimistic and oppose the tax increases. Others are in favor of higher spending on housing, airports, military programs, space and research development, and hospital construction.

This report was prepared in the Business Economics Department, DUN & BRADSTREET, INC., by John W. Riday.

Owner says: "We needed this building fast"



Record shows: 5000-square-foot Armco Building ordered, erected and in service in 7 weeks



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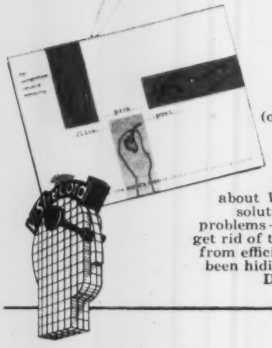

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Failures . . **Latest trends in business casualties**

Recovery Slows Casualty Climb

REFLECTING the impact of the recession, business failures in the year 1958 reached a new postwar high of 14,964 and involved liabilities of $728 million. However, the brunt of the economy's downturn was felt in the first half of the year when casualties climbed 14 per cent above the comparable period of 1957. Significantly, the increase slackened to 4 per cent in the last half of the year. Furthermore, the failure rate in relation to the operating business population remained moderate—56 per 10,000 enterprises listed in the DUN & BRADSTREET *Reference Book*. This compared with 70 in prewar 1939 and was little more than a third of the 1932 record of 154.

Although all size groups and nearly all lines of business suffered heavier casualties during the year, the most marked increases occurred among failures of large liability size—$100,000 or more—and among manufacturing and wholesaling concerns. For the second year, the rise of failures among manufacturers accelerated. The iron and steel industry had 50 per cent more casualties than in the previous year. The leather and printing and publishing industries reported increases of some 30 per cent. Among retailers, upturns varied widely, from a slight 2 or 3 per cent in food, drug, and apparel stores to 12 per cent in restaurants and 24 per cent in the automotive trade.

Improvements, on the other hand, were noted in the textiles and apparel manufacturing industry, where tolls dipped to the lowest in five years, and in appliance retailing, where a mild decline occurred. In construction, also, the steep climb of recent years abated to 3 per cent in 1958. Declines among subcontractors and heavy construction contractors almost offset the continued rise among general builders.

Geographically, most of the 1958 increase in failures occurred among businesses in large industrial cities and was concentrated in four regions: the New England, Middle Atlantic, South Atlantic, and East North Central states. Shifts from the preceding year were slight in the West South Central region—up 3 per cent—and in the Pacific—down 2 per cent. The West North Central total held even. The East South Central and Mountain states had the only noticeable decline.

FAILURES BY DIVISION OF INDUSTRY

	Cumulative total January–December		Liabilities in million $ January–December	
	1958	1957	1958	1957
MINING, MANUFACTURING	2680	2411	245.6	196.8
Mining—coal, oil, misc.	86	75	17.6	11.6
Food and kindred products	189	183	17.4	11.4
Textile products, apparel	493	500	33.1	30.4
Lumber, lumber products	530	504	30.5	25.1
Paper, printing, publishing	181	136	8.4	9.6
Chemicals, allied products	66	56	4.5	5.5
Leather, leather products	100	77	12.7	7.5
Stone, clay, glass products	62	56	10.6	3.0
Iron, steel, products	177	113	16.8	27.8
Machinery	294	254	38.5	27.5
Transportation equipment	80	76	16.8	8.9
Miscellaneous	422	381	38.7	28.6
WHOLESALE TRADE	1431	1236	82.0	77.9
Food and farm products	330	283	20.9	18.7
Apparel	62	43	2.7	2.5
Drygoods	46	34	1.5	1.4
Lumber, bldg. mats., hdwre	175	154 (R)	12.8	9.1 (R)
Chemicals and drugs	50	45 (R)	1.3	1.9 (R)
Motor vehicles, equipment	67	72 (R)	2.3	3.2 (R)
Miscellaneous	701	605	40.5	41.1
RETAIL TRADE	7514	6895	225.3	186.8
Food and liquor	1127	1096	25.7	24.1
General merchandise	291	265	11.4	11.6
Apparel and accessories	1140 (R)	1122	29.5	24.5
Furniture, furnishings	1041	1004	45.1	37.3
Lumber, bldg. mats., hdwre	504	469	16.0	13.7
Automotive group	1101 (R)	885	39.3	24.3
Eating, drinking places	1436	1279	37.3	28.5
Drug stores	165	162	4.0	4.0
Miscellaneous	709	613	17.0	18.8
CONSTRUCTION	2162	2105	115.1	110.3
General bldg. contractors	872	805	62.8	64.4
Building subcontractors	1169	1175	41.0	36.5
Other contractors	121	125	11.4	9.4
COMMERCIAL SERVICE	1177	1092	60.3	43.4
TOTAL UNITED STATES	14,964	13,739	728.3	615.3

Liabilities are rounded to the nearest million; they do not necessarily add up to totals.
(R)Revised.

THE FAILURE RECORD

	Dec. 1958	Year 1958	Year 1957	% Chg.†
DUN'S FAILURE INDEX*				
Unadjusted	48.2	55.9	51.7	+8
Adjusted, seasonally	51.3	—	—	—
NUMBER OF FAILURES	1,082	14,964	13,739	+9
NUMBER BY SIZE OF DEBT				
Under $5,000	147	2,028	2,001	+1
$5,000–$25,000	530	7,015	6,699	+5
$25,000–$100,000	311	4,456	3,847	+16
Over $100,000	94	1,465	1,192	+23
NUMBER BY INDUSTRY GROUPS				
Manufacturing	185	2,680	2,411	+11
Wholesale trade	118	1,431	1,236	+16
Retail trade	515	7,514	6,895	+9
Construction	176	2,162	2,105	+3
Commercial service	88	1,177	1,092	+8
LIABILITIES (*in thousands*)				
CURRENT	$57,069	$728,258	$615,293	+18
TOTAL	57,319	740,451	620,840	+19

*Apparent annual failures per 10,000 enterprises listed in the DUN & BRADSTREET *Reference Book*.

†Percentage change, Year 1958 from 1957.

In this record, a "failure" occurs when a concern is involved in a court proceeding or in a voluntary action likely to end in a loss to creditors. "Current liabilities" here include obligations held by banks, officers, affiliated and supply companies, or the governments; they do not include long-term publicly held obligations.

This report was prepared in the Business Economics Department by Rowena Wyant.

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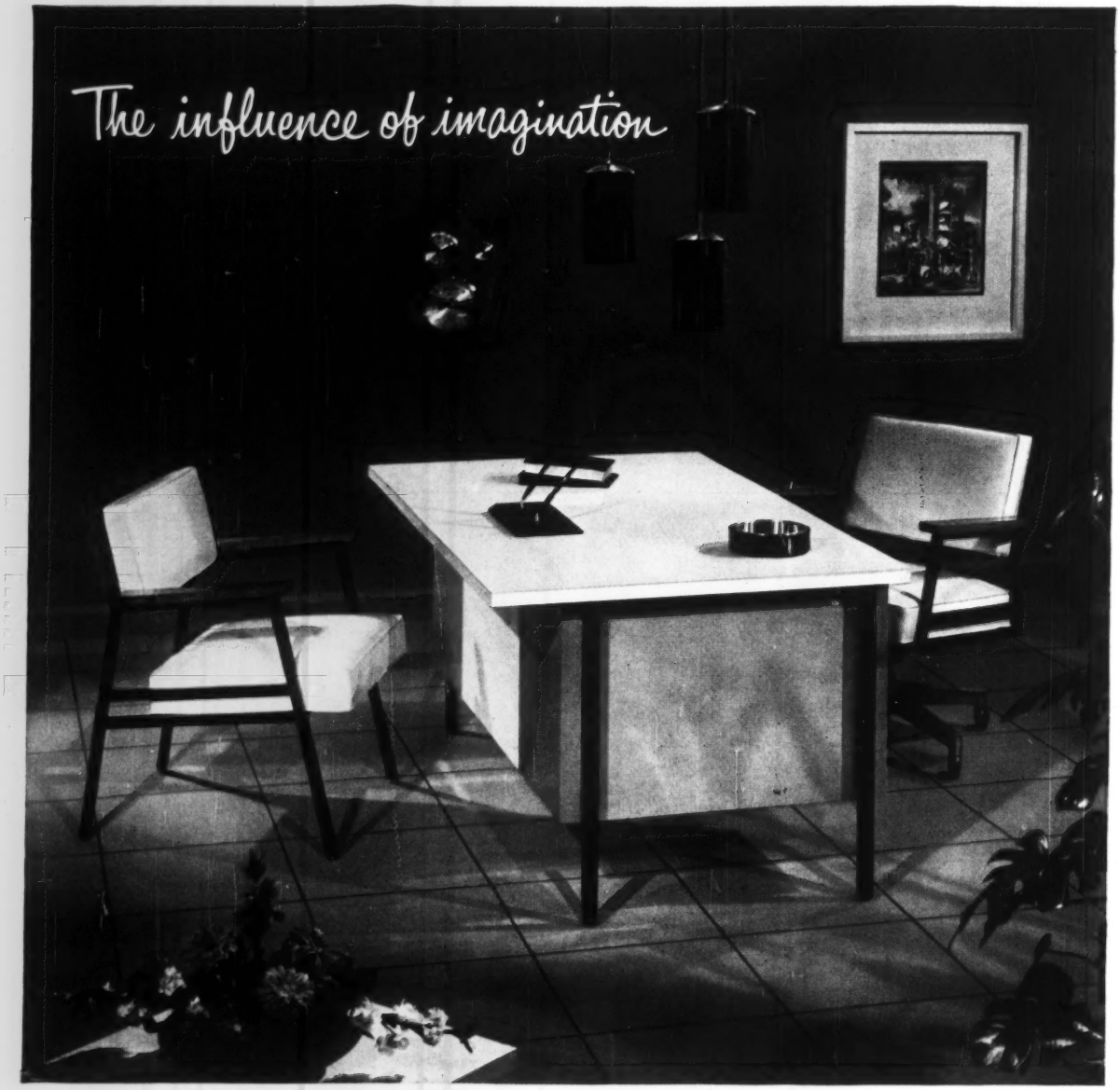

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WASHINGTON Business Front

JOSEPH R. SLEVIN

WASHINGTON, D.C. — President Eisenhower is continuing to press his anti-inflation campaign, and there's no let-up in sight. He is in deadly earnest, and the intensity of his conviction has taken more than one key member of the Administration by surprise. Achieving stable prices ranks with balancing the budget as Mr. Eisenhower's prime domestic target during the final two years of his Administration.

The President has abandoned the so-called Eisenhower Republican philosophy of the middle four years of his Administration in favor of the more conservative, orthodox Republican philosophy that he advocated during the 1952 election campaign and during the months immediately after he entered the White House. Officials close to the President trace the recent switch in Mr. Eisenhower's attitude to budget and price developments last Summer.

Although the chief executive abhors unbalanced budgets and deficit financing, it became more and more apparent during the Summer that he was about to preside at the creation of a record-breaking peacetime budget deficit. Mr. Eisenhower had become increasingly restive as rising prices chopped eight cents from the buying power of the dollar between February 1956 and July 1958, and he was dismayed when a fresh surge of inflationary excitement swept through the financial markets in August.

Danger: Inflation ahead

Investors and speculators had decided that the prospect of big budget deficits for two to three years to come could only mean that the budget was out of control, and more inflation was ahead. The connection between the two was impressed upon Mr. Eisenhower by his advisers, and the return to a more conservative presidential philosophy was underway.

Mr. Eisenhower now could shift once more and adopt a less rigid position, but well-informed members of his Administration say they will be surprised if he does.

The budget balancers are in the saddle, and they will not be dislodged easily. The President has the firm support of Secretary of the Treasury Robert B. Anderson, Budget Director Maurice H. Stans, Secretary of Commerce Lewis L. Strauss, and Postmaster General Arthur E. Summerfield. Arrayed on the opposite side are Vice President Richard M. Nixon, Attorney General William P. Rogers, Secretary of Labor James P. Mitchell, and Secretary of Health, Education and Welfare Arthur S. Flemming.

Eisenhower vs. Nixon

The dispute between the two groups boils down to this:

The Eisenhower group believes the President's budget makes adequate provision for defense, foreign aid, and domestic programs, and it is convinced that a balanced budget—which it equates with stable prices and a sound economy—must be the overriding consideration. It contends that a balanced budget is both good national policy and good 1960 Presidential election politics.

The Nixon group disagrees. It maintains that proper provision is not being made for this country's needs, and it is certain that a failure to do more for the voters will lead to a Republican disaster in 1960. The predominant view of the Nixon group members is that the President and his supporters are flouting a genuine groundswell of public opinion that manifested itself in last November's Democratic landslide.

There is no sign at the moment that the dispute will soon be resolved. And, if it is not settled, Mr. Eisenhower will preside over a deeply divided cabinet for the remainder of his term.

It is far from certain that the President will achieve his goal of a balanced budget in fiscal 1960, even if he holds firmly to the course that he charted in his three big January messages on the State of the Union, the budget, and the economy.

Nonpolitical budget experts are widely of the opinion that the Federal Government will spend more money next year than Mr. Eisenhower proposed in his budget, and the view of these outsiders is shared by key members of the Administration's fiscal team.

A rise in spending will mean, of course, that the budget can be balanced only if tax receipts climb, too. Some experts think revenues will exceed the President's forecast, but others disagree.

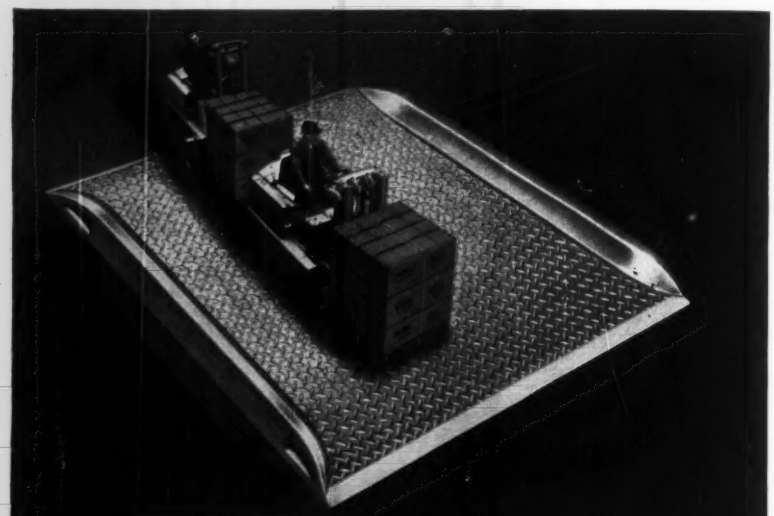
The pressure to spend

A number of pressures are expected to boost spending above the President's estimate. The most important is the determination of many members of the Democratic-controlled Congress to vote more and bigger spending programs than the President has recommended. There is strong support for increasing the size of the defense effort and for voting huskier social welfare and public works programs. A new international crisis or a scientific breakthrough in weapons technology would generate fresh demands for larger outlays.

Democratic calls for additional Federal programs are more muted than they were before Mr. Eisenhower began his drive to arouse the country and Congress to the danger of inflation and to the threat of an unbalanced budget. Some Democrats are a little less positive than they were that larger Federal spending programs are sure-fire vote getters. The legislators are wary of the "spendthrift" tag that the President will try to pin on the advocates of big spending programs, and they are moving more cautiously.

Budget balancing draws yawns

There is no evidence as yet, though, that Mr. Eisenhower is succeeding in his attempt to whip up enthusiastic public support for a tight-fisted, budget-balancing program. Few letters come to either the Adminstration or Congress from people who are worried about high prices and inflation. The public is apathetic. The current trickle of mail contrasts markedly with the flood of communications that inundated Washington last Winter at the bottom of the 1958 recession. Everyone from corporation



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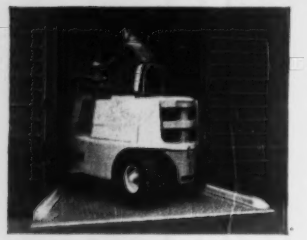

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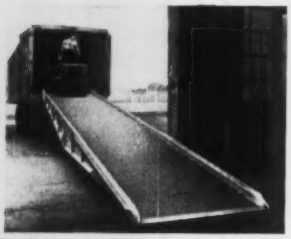

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presidents to jobless laborers wrote in and demanded that the Government take immediate action to restore prosperity.

Mr. Eisenhower may be able to excite support for a tough anti-inflation drive, but he has a long way to go. Historical memories can make an enormous difference. West Germany's most vivid economic memory is of the virulent inflation that destroyed the mark and wrecked the economy of the Weimar Republic after World War I. The government of Chancellor Konrad Adenauer has leaned over backward to prevent inflation. But the controlling historical memory in the United States is of the depression of the 1930's—and the dominant objective of Congress and the Administration has been the prevention of large-scale unemployment.

Sauce for the gander

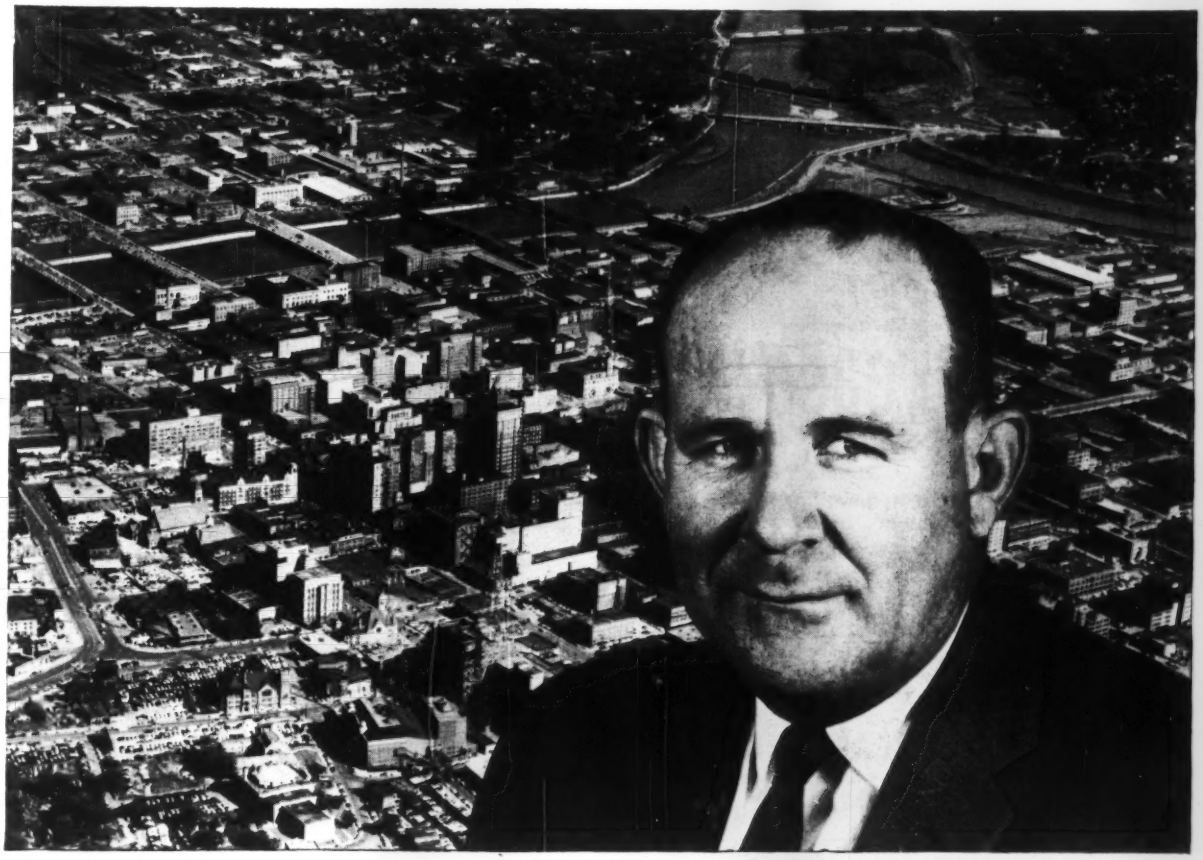
The Administration's determination to halt inflation and to balance the budget has been stiffened by widespread foreign criticism of this country's inability to keep its financial house in order. The United States ever since World War II has been freely advising other countries to balance their budgets, to limit credit expansion, and to stabilize prices. Now their financial officials have been letting us know that they think it's time for us to practice what we preach. Secretary Anderson got an earful in New Delhi last October at the annual meeting of the International Monetary Fund and the International Bank for Reconstruction and Development, and he didn't like it one bit.

Failure to achieve a balanced budget and stabilized prices will mean that the United States will be listened to with far less respect when it urges other countries to pursue sound policies in the future. It also will mean that spiraling prices for American goods will price United States business men out of many overseas markets.

The President and his advisers are painfully aware that balancing the budget will eliminate a major inflationary force, but will not guarantee stable prices. American prices will go up as long as wage and salary increases continue to outstrip productivity gains. That's the cost-push side of the inflation problem, and Mr. Eisenhower's January economic report made it plain that the Administration has no easy answers.

Paving the way for tax cuts

Attaining a balanced budget would have one future consequence that would be widely hailed by a good many individuals and companies, for it would lead directly to an Administration move to cut taxes. The Administration believes taxes are too high and that the private sector of the economy should be stimu-



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lated by a reduction in Federal levies. It would like to see private activity go up and Government spending go down.

Not everyone agrees, as a number of recent studies have demonstrated. Many people—and they aren't all Democrats—believe the Government must divert a larger part of this country's resources to defense, scientific, foreign aid, educational, and welfare measures if the United States is to win the cold war. These are the people who say the American economy isn't getting stronger just because we can produce and buy more automobiles, refrigerators, washing machines, television sets, and other good things of life.

Too much of a good thing

Some Government economists are coming to the melancholy conclusion that the stabilization measures that have been adopted since 1929 are proving too successful. Let it be said that they are not seriously pointing the finger at social security benefits, unemployment compensation, and other income substitute devices that helped to cushion the recession. But they have come up with the half-whimsical, half-serious notion that stock margin requirements are proving too successful in keeping jumpy, shoestring speculators out of the stock market.

There hasn't been a really bad stock market break since the mid-1930's. Many Government experts would have liked to see the market go down instead of up during last year's recession. They think the fact that the investing public hasn't been hurt in more than two decades is at least partly responsible for the willingness of investors to hold on to securities in the face of small price breaks. Speculators don't have the fear they once had of a market crash. END

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Despite its surprisingly low price, the new Bantam is a true Verifax Copier in every sense. A snap for anyone to operate. And so trim and compact you will find room for one in the smallest office.

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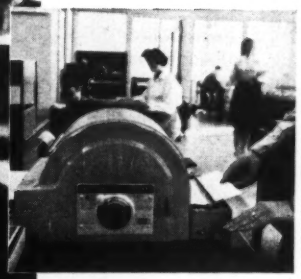
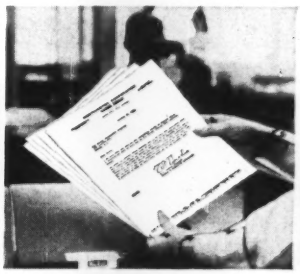
Price shown is manufacturer's suggested price and is subject to change without notice.

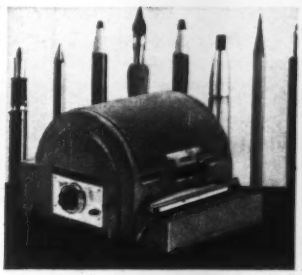
Kodak Verifax Bantam Copier outperforms copiers costing up to 4 times as much!



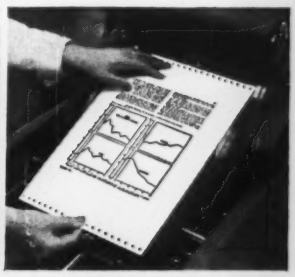
Makes 5 dry, clean, white copies in 1 minute for 2½¢ each. Verifax copies can be made on one or both sides of bond-type paper, card stock, printed office forms.



Verifax copies are accurate and complete . . . easy to read—have look and feel of a good letterhead. And they'll last as long as any typed record, won't fade.



Write with anything—you can copy ball-point, crayon—what have you—as easily as typed data. Even those purplish duplicator copies and rubber stamps are a snap!



Even makes an offset master in 1 minute for less than 20¢, with low-cost adapter. A translucent master for whiteprint machines can also be made in 1 minute.

Verifax Copying

DOES MORE . . . COSTS LESS . . . MISSES NOTHING

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EASTMAN KODAK COMPANY, *Business Photo Methods Division*
343 State St., Rochester 4, N.Y.

Gentlemen: Send booklet describing Verifax Copiers and short cuts for boss and secretary. Also names of nearby dealers.

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Position_____

Company_____

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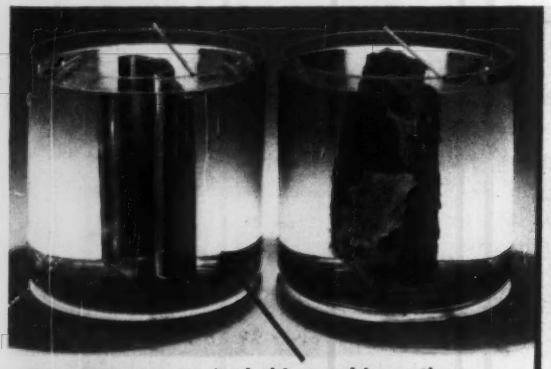
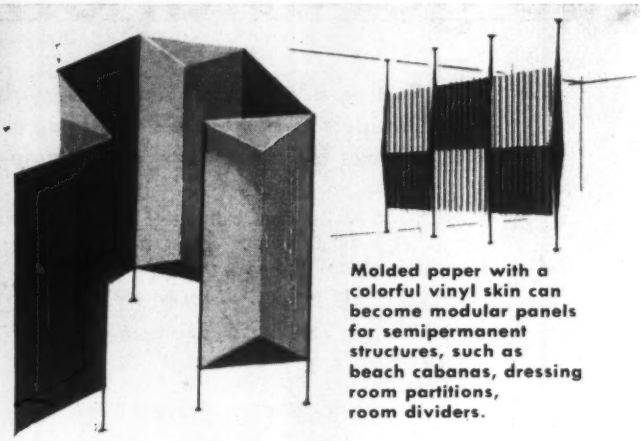
City_____ State_____

Kodak

A NEW WAY TO UPGRADE YOUR PRODUCTS: VINYL COATINGS



The transparent vinyl skin on this section of a pulp-molded shipping tray makes it impervious to water.



Molded paper with a colorful vinyl skin can become modular panels for semipermanent structures, such as beach cabanas, dressing room partitions, room dividers.

Weatherproof covered pallets of paper pulp can withstand weather—could multiply warehouse space.

Vinyl-coated pulp-molded covers can make shipping containers that permit flat car shipping, and outside storage.

Colorful, leather-y coatings for molded paper

Vinyl coatings can help you develop new products made of molded paper with its attendant advantages of low-cost tooling. You can turn molded paper pulp into an altogether new material with a single spray or dip coating.

The vinyl dispersion transforms molded paper pulp into a smooth, brightly colored weatherproof, waterproof material. A "skin" up to 60 mils thick can be put over a molded paper product and heat-cured quickly into a permanent, abrasion resistant, leathery-tough film.

You can make the coating soft and rubbery or as hard as a tire casing. The vinyl coating can be glossy, satin-y, or dull; the characteristics of the skin, like the choice of color, are determined by the formulation of the dispersion.

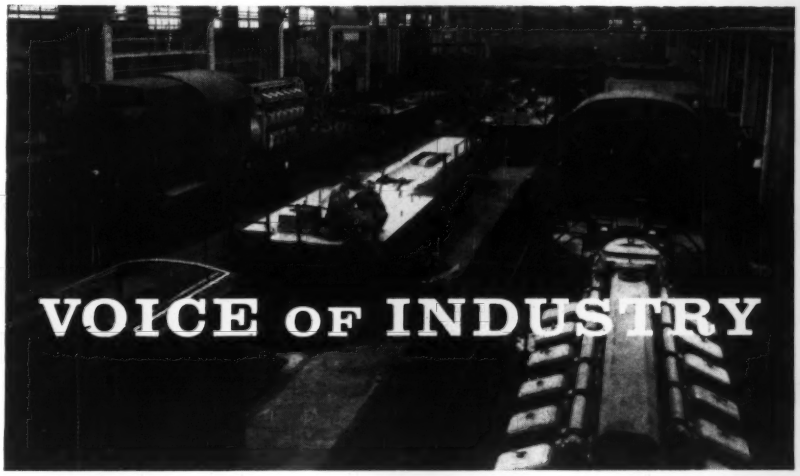
Write for sources of vinyl in liquid form for coating paper—or sheet metal, glass, or products of wire or expanded steel. You can open new markets with new products.

Organic Chemicals Division
MONSANTO CHEMICAL COMPANY
Dept. SP-6, St. Louis 24, Missouri

Monsanto manufactures a wide variety of plasticizers and Opalon® resins for formulators of these high-quality vinyl dispersions.

Monsanto®

Where Creative Chemistry Works Wonders for You



Political Leadership: A Business Man's Duty

ALSO: ***Selling for Survival; Jobs for Tomorrow's Top Management; Roadblocks to Automation; Countering Soviet Gains.***

Politics: Whose Business?

CHARLES A. PERLITZ, JR., *executive vice president, Continental Oil Company, before the Texas Personnel and Management Association.*

The influence of business leaders in national affairs has been waning because business men have simply not properly understood the interdependence of business and political matters. Our attitude of detachment and indifference about politics and politicians is creating a fertile field for those who would shackle or destroy our free enterprise system to serve their own selfish ends. The business man must hear the clamor and feel the threat of the growing number of political voices that are being raised against him. He must rise strong and react in the only possible curative way. He must make his influence felt in the field of politics and government affairs —and in a public-spirited, constructive manner.

Business men must recognize that Government regulation and intervention is necessary in our economy in many cases, and it is likely that as the economy becomes increasingly complex, the Government will be called upon to umpire an increasing number of situations. Blanket, unreasoning opposition to any and all legislative, regulatory, and other Government agencies is often self-defeating. Many Government agencies are doing a splendid job, and business should give credit where credit is due.

Business leaders must recognize their responsibility lies not in "fighting" the Government but rather in participating constructively in political affairs. They must speak to the people with courage and honesty.

Marketing in the Hot Seat

RAY R. EPPERT, *president, Burroughs Corp., before the National Association of Manufacturers.*

One thing that has been proved conclusively in the United States is that we can produce at any desired or necessary level. The big question now is simply this: At what level can we sell?

Any production schedule that is so

3 TOP VALUES
From Among 80 BIG JOE Lift Truck Models

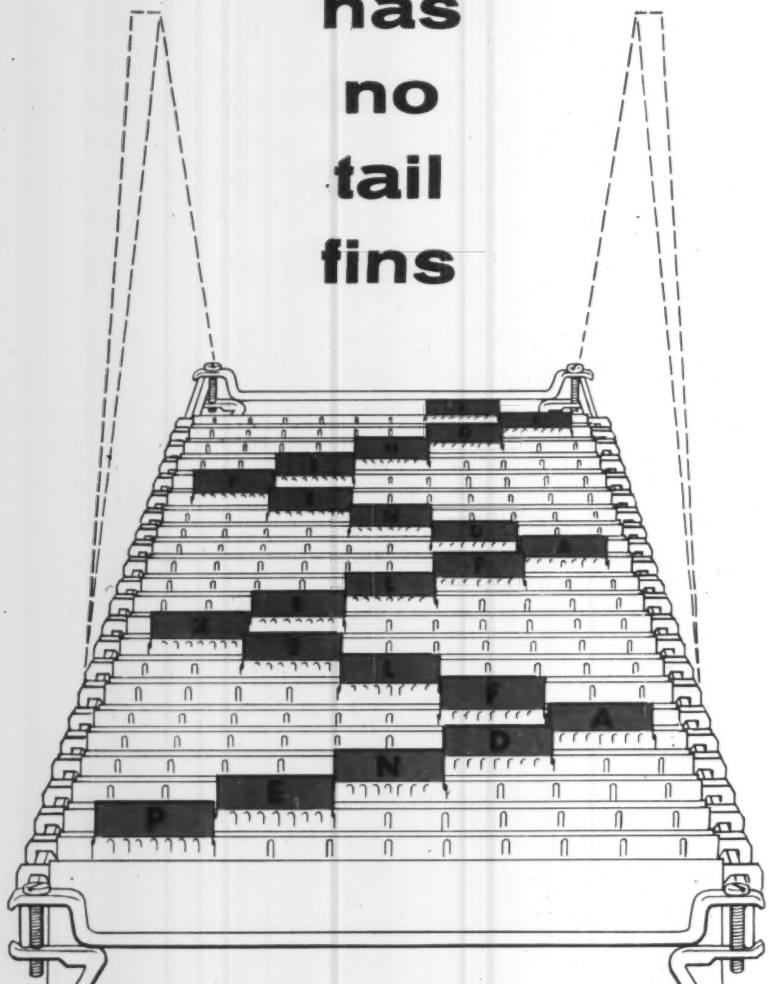
1
"the PEDALIFT 21"
$199.00 complete
1000 lb. capacity
54 in. lifting height

2
"the 299"
$299.00 complete
1000 lb. capacity
57 in. lifting height
Battery Operated

3
"the CHALLENGER"
$397.50 complete
1500 lb. capacity
57 in. lifting height
Battery Operated

Hydraulic Handling for EVERY Department
BIG JOE
Manufacturing Company
Ralph Hines Road
Wisconsin Dells, Wisconsin

Why PENDAFLEX® has no tail fins



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unrealistic that needed working capital is piling up in excess finished goods inventory is doomed to a very short life. The urgent need for greater revenue has brought a realization of the necessity for a coordinated, integrated, total corporate team effort.

A high level of sales, however, is no automatic guarantee of profits. The salesman must be supported in depth. The right decisions must be made in research and development, product planning, market analysis, sales training, advertising, and so on. As the recession reminded us, we have added greatly to our fixed costs and raised our breakeven points.

Top management's nightmare is the horrible thought, "What would happen to us if in the next quarter we suddenly saw our revenue, our sales, decrease 10, 15, or 20 per cent?" In most instances this would not merely decrease profits correspondingly—it would wipe them out. Business must grow or die. It must grow on the revenue front, over and above high fixed costs and high breakeven points.

Now is the time to review our operations, to install cost-cutting equipment, and to streamline our organization for greater productivity. Now is the time to research and develop those products we are going to need in future years and to increase our selling impact. The dynamism of the American economy is not built in. It must be continually generated by the energy and capacities of American management, especially marketing management.

Making Room for Middle Management

DR. VAN ZANDT WILLIAMS, *executive vice president, Perkin-Elmer Corp., before the Canadian Pharmaceutical Manufacturers Association.*

A primary responsibility of the corporate enterprise is to absorb the rapidly growing level of middle management personnel so that these people may have the purchasing power to maintain the economy. It cannot use this class of educated, responsibility- and compensation-demanding personnel efficiently in the present realm of the products of private enterprise. Yet, corporate management will not give up this manpower talent from which must come its own replacements.

A certain amount of the absorption will occur in further swelling of line functions, but this cannot extend too far. The only area, therefore, that I

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There's a new way for you and your staff to keep appointments *today* anywhere in the U.S.A.—on short notice—and *on time.* It's the 1959 model of the reliable ON MARK MARKETEER—the fastest, safest Executive Airplane on the market.

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Lease arrangements can be easily made; or if you now have a smaller, slower corporate airplane we will give you a liberal trade-in allowance. If you now own a modified B-26 we can remake it for you at low cost to incorporate some or all of the improvements for which the ON MARK MARKETEER has become famous. Ask for our brochure which illustrates the many features of this remarkable aircraft for corporate use.

Robert O. Denny

ROBERT O. DENNY, *President*

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a suit
to see
if it fits...

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Whatever your banking problem or need—if it calls for the services of a Canadian bank, we'd like the opportunity to help you solve it. Instead of just talking about our facilities and service we're saying "see for yourself."

Example: if you plan a business expansion in Canada, we can advise you on Canadian incorporation procedures . . . help you find plant locations . . . distributors . . . or advise you on the habits and customs of Canadians all over the country.

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BANK

can project for this absorption is that which is now described as the area of public enterprise—such fields as education, public buildings and transportation, medicine, politics, and international government programs.

The area of private enterprise has carried its product contribution to the standard of living much further than has that of public enterprise. We have reached a limit of this imbalance, and, I believe, we generally feel as individuals that an additional car or television set will contribute less to our standard of living than would an improvement in education, better roads, or the easing of world tensions.

Basically, private enterprise must foot the public enterprise bill either directly or indirectly. It will want to maintain a hand in the expenditure of that bill. Furthermore, certain of the public enterprise efforts can have a direct bearing on the corporation's private business. The provision of aid to underdeveloped areas is a natural business extension. Even where such direct benefit is not obvious, the broadening of its corporate knowledge for other products and markets, or the playback on the corporate image will represent indirect returns.

Automation Pushes Ahead

J. EDWARD TRAINER, *executive vice president, The Firestone Tire & Rubber Company, before the American Instrument Society.*

There are powerful forces working against widespread automation in industry. There is, first of all, the capital investments that must be made to introduce or extend automation in any industry or business. Until a business can accumulate sufficient capital-investment funds, that business is not going to be automated. The price is simply too high.

Another important force, which even today is slowing down or retarding the automation of individual industries, is the lack of trained personnel to manufacture, install, control, and maintain the devices of automation.

The most important reason of all, perhaps, why automation on any widespread scale will be relatively long in coming is the apparently widespread belief outside the professions responsible for automation that everything has been accomplished. This is ridiculous in view of the facts. The field is so big, the possibilities are so great,

NOW! the "GENERAL" . . . revolutionary all new high-speed punching machine

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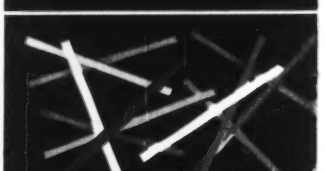
GBC Bound Books LIE FLAT . . . pages turn easily

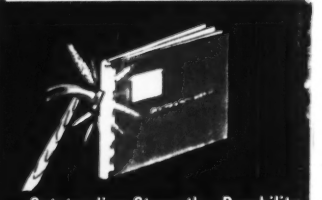
Bind ANY SIZE—ANY LENGTH

Bind ANY THICKNESS from 3/16 to the NEW BIG 2" "SURE-LOX"



Bind in any of 14 Sparkling COLORS

With the same equipment bind in 5 BINDING STYLES including plastic and metal loose leaf!



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that even to contemplate the end is to deny the beginning—and that is essentially where we are now.

There are, on the other hand, three principal forces pushing us toward a rapid change: the absolute necessity for self-preservation in the face of the threat of national destruction, the basic need for increased productivity to maintain a normal upward rate in our standard of living, and the irresistible force of knowledge which can never be penned up for long.

And for this latter reason, if for no other, our ever-expanding scientific know-how will find its way—despite everything—into useful channels. And one of the most important of these will be industry.

A Plan for Economic Victory

JOHN J. POWERS, JR., *President and chairman of the board, Pfizer International, before the Pharmaceutical Manufacturers Association.*

A recent trip to Communist countries and reported Communist efforts to disrupt traditional trade and economic patterns lead me to the inevitable conclusion that the Third World War has already started.

We are not in the midst of a series of irritating trade problems between wars —we are in war itself. Yet, the United States Government seems to be keeping its most vigorous weapon, American private industry, on the shelf while it shoots missiles at the moon—and at industry. The Government wants to counter the Communist industrialization offensive in the underdeveloped nations, and has the finances to do so but not the technical know-how. We of industry want to participate in the long-range industrialization programs of these countries. We have the know-how but are inevitably limited in the risks which we are entitled to take with our stockholders' money.

An awakened U.S. Government can offer major help—indeed, it can make industry a vital part of the economic counter-offensive—by providing funds for long-term financing to American and local industry. This can be done simply by diverting a part of foreign-aid funds for such loans. I don't mean subsidies—I mean loans repayable in local currencies from the earnings of local enterprise. Such a program would put Government money and industry's manpower, time, and skills at equal risk in a free and powerful alliance.

SURVEY REPORTS SKIN DISEASE IS INDUSTRY'S NO. 1 HYGIENE PROBLEM

Here's What To Do About It In Your Plant

Recently, 2,177 major plants were surveyed by a market analyst to discover their No. 1 skin hygiene problem. The overwhelming majority of replies said: SKIN DISEASE.

The reasons for this answer:
—skin disease means costly medical treatment
—skin disease means prolonged absenteeism
—skin disease means worker dissatisfaction and compensation claims

What can you do in your plant to fight this problem? Call in an SBS skin cleanser representative. Most skin disease troubles can be traced to improper cleaning or use of the wrong cleaners. Your SBS representative is the man most completely equipped to study the situation and offer measures to improve it. He'll check all the conditions in your plant and recommend . . . not just a soap, but a *planned corrective skin hygiene program* for safe skin cleansing. Because Sugar Beet Products produces a *complete range of cleansers*, the SBS man can recommend the *exact ones* for your needs. Many famous firms are protected by SBS skin cleanser programs. Why not write us today? Dept. 58-B2

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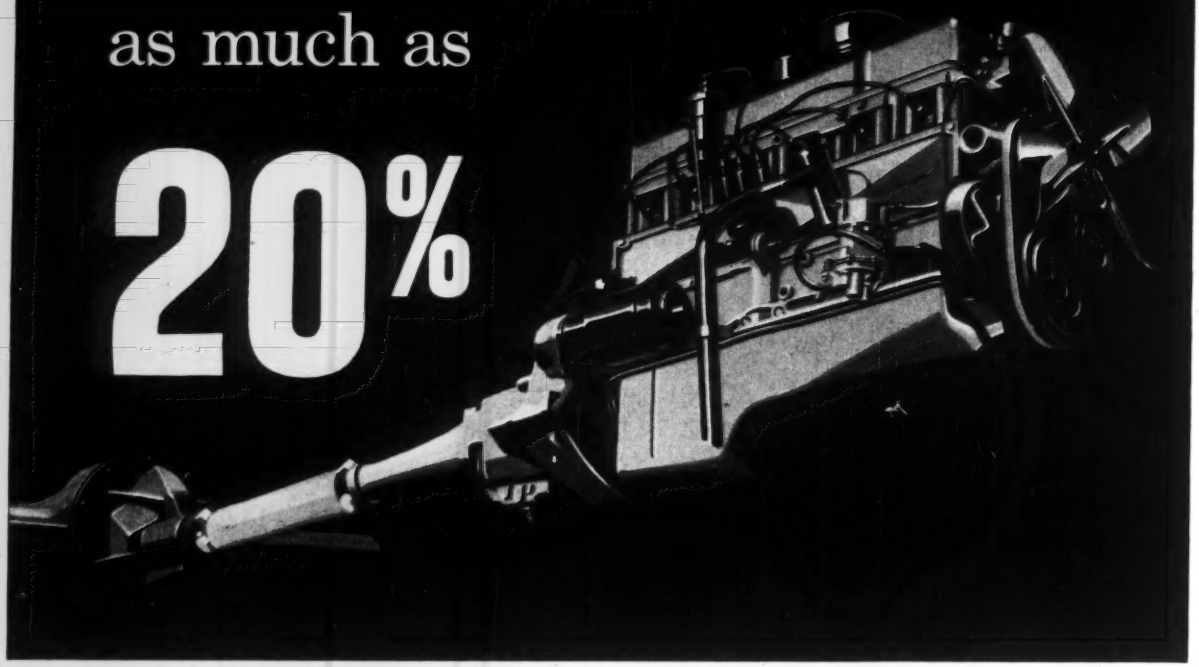
SAGINAW, MICH. • Los Angeles, Calif. • Newark, N.J
CANADA: Chemical By-Products, Ltd., Toronto, Ontario

With new features and options, '59 Chevrolet truck 6 boosts fuel economy by as much as

20%



A new camshaft design and a new maximum-economy option* bring you this remarkable increase in gas savings with Chevy's Thriftmaster 6.†

This newly improved engine for '59 offers fuel economy that can mean up to one dollar saved out of every five spent for gas! Its outstanding gas-saving ability stems from two new engineering refinements.

The first is an *economy-contoured camshaft* that's machined to provide a lower lift and reduced valve overlap. This feature offers up to 10% less fuel consumption in every '59 Chevy Series 30 or 40 model with standard Thriftmaster 6!

The second innovation is a new *maximum-economy option* that operates in combination with the economy-contoured camshaft in Series 31 and 32 models. Consisting of a new smaller venturi carburetor and new economy ratio rear axle, this option boosts fuel economy as much as an additional 10%! Thus, Series 31 and 32 Chevies with the new Thriftmaster 6 can be equipped to reduce your operating costs by up to 20%!

This is the kind of low-cost truck power you've been looking for—so see your Chevy dealer soon for all the details! . . . Chevrolet Division of General Motors, Detroit 2, Mich.

**Optional at extra cost.*

†And it uses regular gas, like all Chevy engines.

CHEVROLET TASK·FORCE 59 TRUCKS

CHEVROLET

What the Missile Program Means to Industry

HERBERT C. ROSENTHAL

The coming of the missile age is more than a technological revolution—it's a matter of vital dollars-and-cents concern to thousands of manufacturers across the nation. Here are the facts and figures to help you see where your company may fit into the big picture.

MISSILES are creating more than $6.5 billion in new business yearly for thousands of American industrial plants whose normal production ranges from aircraft to razor blades.

Seventy-five major prime contractors and an estimated four to five thousand subcontractors employing 400,000 workers are currently at work on Government missile contracts that bolster their sales, cushion them against sharp swings in the economy, and give them an inside track on valuable technology with profitable future applications in the manufacture of civilian products.

The size of the new missile industry can be assessed quickly by a couple of comparisons. The $6.5 billion spent on missiles, satellites, and space flight in the current Federal fiscal year is two and a half times more than the annual expenditures for atomic energy development. And it is more than half as much as Americans spent last year for new cars.

Most of this missile money goes for highly skilled personnel and expensive research and materials, rather than for the mass production of units. Major General Bernard A. Schriever, Commander of the Air Force Ballistic Missile Division, estimates, for example, that when the Atlas and Titan intercontinental ballistic missiles are in production, they will cost between $1.5 and $1.8 million apiece. Each Thor intermediate range ballistic missile will cost close to $1 million in production. Research and development models are considerably more expensive.

According to the Association of Missile and Rocket Industries (a new trade association for a new industry), the Department of Defense since World War II has revealed about 160 missiles by name, and another 32 are known to exist. About 40 of these can be classified as major projects.

Three hundred thousand parts go into each of the "big birds." A fantastically complicated assembly of wires, vacuum tubes, transistors, seals, generators, valves, and regulators is sheathed in an airframe of heat- and friction-resistant alloys. Often capped by ceramic nose cones that can withstand the heat and stresses of leaving and reentering the earth's atmosphere, and powered by ramjet, pulsejet, plasmajet, or rocket engines, the missiles burn hydrazines, liquid nitrogen, anhydrous ammonia, boron, and other exotic fuels with liquid oxygen as they zoom through space. They are guided by complex electronic circuitry, utilizing miniaturization techniques together with high precision hydraulic and mechanical components.

Supplying even the major components of such an intricate device requires the efforts of a number of manufacturers scattered across the country.

This missile production teamwork is illustrated by production plans for

Getting In as a Subcontractor

Which companies garner most of the prime missile contracts, and what are a small company's chances of breaking into the missile business as a subcontractor? The answers vary slightly, depending upon which service is letting the contract.

Air Force: The prime contractor must have the ability and facilities to provide the over-all technical control of the entire project and to insure the interrelated operation of all the missile and missile system parts. The prime contractor is further required to farm out as much work as possible to specialized subcontractors and, finally, to assemble the finished product. Although the Air Force feels that the aircraft companies generally meet these criteria best at present, it insists the field is not closed to other industries. Today's nonsupplier can break into the missile business as a subcontractor, the Air Force says, if he is competitive and makes his capabilities known to the prime contractor and the Air Force. Information on subcontracting opportunities may be obtained by writing to the Small Business Specialist at the nearest Air Procurement District Office.

Army: The Army Ordnance Missile Command maintains a file on industrial concerns, containing information on commercial and defense products, engineering capability, plant space and equipment, financial status, and so on. Companies may submit this information to the Commanding General, U.S. Army Ordnance Missile Command, Redstone Arsenal, Ala. Bids on Army missile contracts are secured through eleven district offices spotted around the country. In addition to administering contracts approved by the Missile Command, the district offices make available information on procurements, drawings, specifications, and subcontracting possibilities.

Navy: Prime contracts for missiles and related equipment have been awarded to many companies outside the aircraft industry. The Navy encourages technical as well as price competition in all phases of its missile program. For example, in a recent Bureau of Ordnance procurement involving the Subroc weapons system, 65 commercial sources were solicited before a final selection was made. In the recent Eagle missile program, the Navy's Bureau of Aeronautics considered twenty companies in the electronics and aviation industries. The Navy also encourages all prime contractors to support the small business program by subcontracting to smaller companies whenever this may be possible.

Detailed information on the missile and rocket programs of all the Armed Services may be had by writing to the Office of the Secretary of Defense, Washington 25, D.C., for the brochure *General Procurement Information on Guided Missile Programs and Rockets.*

In addition to applying through service channels, it may be possible to pick up business direct from a contractor. Turn to page 116 for a list of major prime contractors at work on the missile program.

DRAMATIC NIGHT FIRING *of two powerful rocket engines at Bell Aircraft Corp.'s rocket facility, where first rocket thrust chamber firings using liquid fluorine were made.*

the Air Force's Titan ICBM. The Martin Company will assemble the Titan at its Denver plant and will supply the airframe. Thompson Ramo-Wooldridge Company of Los Angeles will provide the technical direction. The nose cone will come from Avco's Stratford, Conn., plant. Aerojet General Corp. of Sacramento, Calif., will supply the propulsion system—a two-stage rocket utilizing liquid fuel—and an auxiliary power unit for ground support.

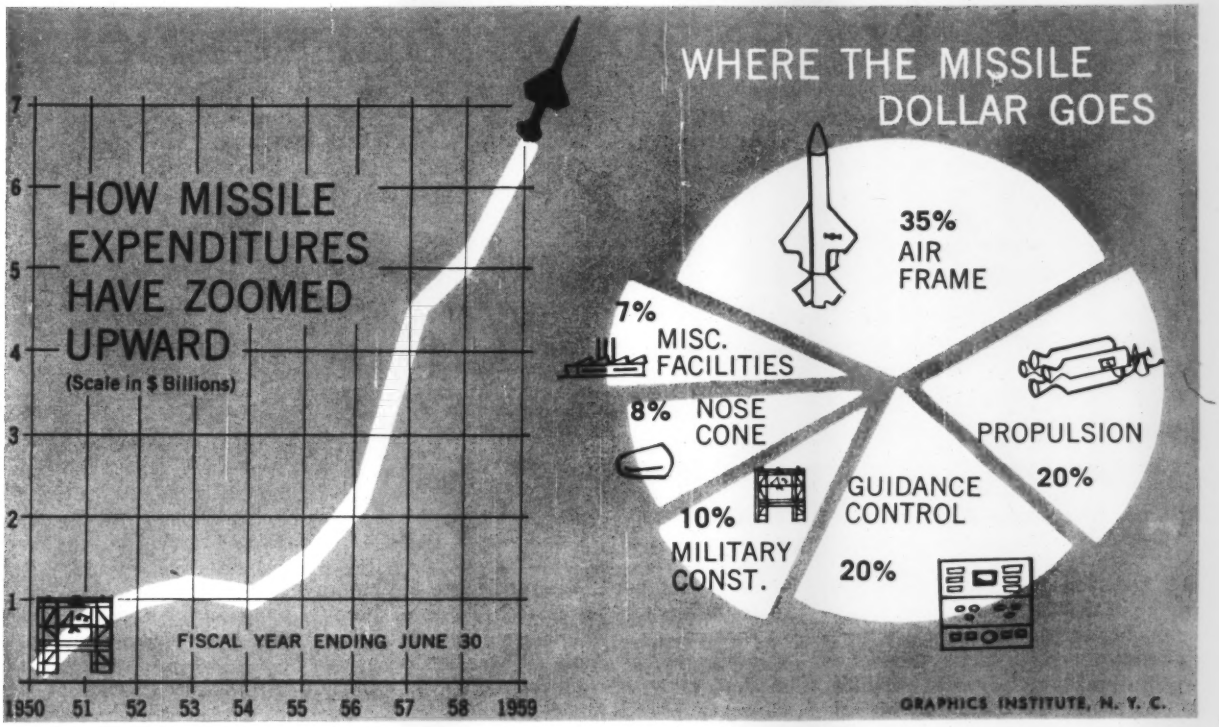
The jobs of designing and manufacturing the Titan's guidance units have been assigned to Bell Telephone Laboratories of Whippany, N.J., Arma Bosch of Garden City, N.Y., and Sperry Rand's St. Paul, Minn., plant. Armaments, including the nuclear warhead, will come from the Atomic Energy Commission at Los Alamos, N.M., and the Sandia Corp., Albuquerque, N.M. These, in turn, will purchase components from hundreds of other concerns.

Big push in technology

The technological impact of the missile program has had a far-reaching effect. The aircraft industry has been forced to come up with completely new testing techniques and methods of manufacturing and assembly to build guided missile equipment capable of withstanding accelerations, vibrations, heat, stresses, and strains of an order never encountered in any other device created by man. This technological impact has also been felt in metallurgy, electronics, ceramics, chemical processing, and many other industries.

An interesting case history of technological progress comes out of the Navaho ICBM—a seemingly unsuccessful missile project the Air Force cancelled a year or so ago after more than $700 million had been spent on development. Far from being a dead loss, this project sired a number of technological developments that have important military and civilian applications. Among them are:

- *Materials and manufacturing techniques.* The Navaho's requirements forced development of light, high-strength materials: titanium alloys that would resist tremendous heat caused by air friction and the rocket and ramjet engines; "honeycomb panels," strong, light, corrugated, sandwich-like construction material; and strong, prestretched stainless steel sheets. The Navaho's circular shape

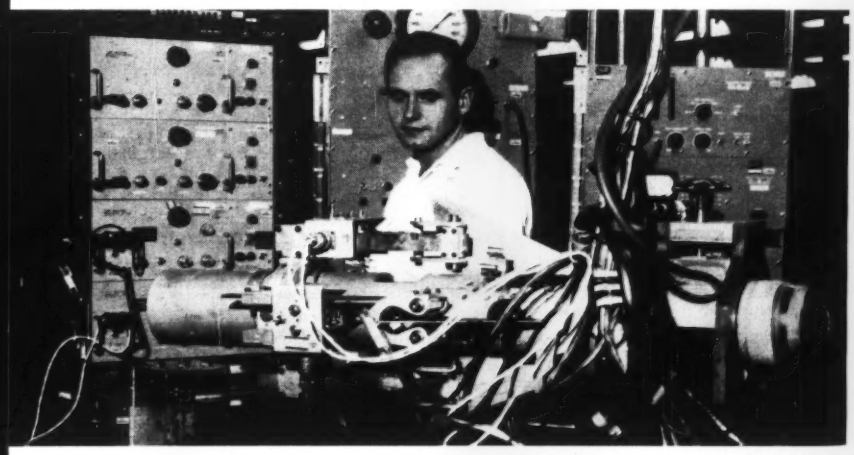

HOW MISSILE EXPENDITURES HAVE ZOOMED UPWARD
(Scale in $ Billions)
FISCAL YEAR ENDING JUNE 30
1950 51 52 53 54 55 56 57 58 1959
WHERE THE MISSILE DOLLAR GOES
35% AIR FRAME
PROPULSION 20%
GUIDANCE CONTROL 20%
10% MILITARY CONST.
8% NOSE CONE
7% MISC. FACILITIES
GRAPHICS INSTITUTE, N. Y. C.

couldn't be machined, so North American Aviation, creator of Navaho, developed a chemical milling process now used for 80 other missiles and aircraft. The Navaho's size and shape also forced the development of new welding techniques that are widely applied to other missiles.

● *Propulsion equipment.* During the course of Navaho's development, its rocket engine was increased in thrust from 75,000 lbs. to 415,000 lbs.—thereby providing the design for rockets to power the Jupiter satellite and Thor and Atlas ICBM's. Gas generators, turbopumps, and other propulsion components also were designed and produced.

● *Miniaturization.* Gas generators less than 1 foot in diameter were designed to operate the turbopumps.

● *Guidance and navigation.* A new principle of paired gyros in an autonavigation developed for the Navaho later made possible the historic voyage of the atomic submarine Nautilus under the North Pole. This inertial guidance system attains high accuracy within practical manufacturing precision requirements. The system is being applied to other missiles, a Mach 3 (high speed) chemical bomber, a hypersonic fighter, and other military equipment.



DEADLY ACCURACY *of an air-to-air Sidewinder missile is checked on simulated flight test equipment at Philco's Government and Industrial Division in Philadelphia.*

Other important by-products

Other important guidance units developed for the Navaho program include accelerometers capable of measuring forces ranging from .05 G to 8 G's, highly accurate distance measuring equipment, and a celestial navigation system for daytime use in correcting inertial guidance errors. The completely automatic and self-contained recovery system that will be used in U.S. space vehicles also came out of the pilotless X-10 test vehicle developed for the Navaho program.

● *Development and test facilities.* To develop the Navaho's rocket motors, North American Aviation built its huge Rocketdyne test facilities, where almost all large liquid-fueled rocket development in the United States has taken place in the last ten years. And a supersonic wind tunnel North American built for testing and study of Navaho models helped develop the design for the Hound Dog missile, F-108 interceptor, B-70 intercontinental bomber, and other weapons.

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PLANNED OBSOLESCENCE:
Rx for Tired Markets?

Don't count on timing your future product improvements to spark replacement demand. It doesn't work that way, warns the author of best-selling "Madison Avenue, U.S.A."

MARTIN MAYER

WE SEE before us a most perplexed person, a man who is wondering how he ought to feel at this moment. He is the controller of a large corporation which makes electrical products, mostly big-ticket items, for the consumer market. And he is visiting the home of a friend, who is just now showing him the kitchen. Over against the wall, he sees an electric stove which his company made more than twenty years ago when electric stoves were a relatively new idea. The stove gleams. It is obviously in steady use and carefully kept up. Somebody loves it.

"That was one of ours, wasn't it?" says the controller.

"Yes," says his friend happily. "It's a wonderful stove."

The controller's automatic reaction is a feeling of pride in the quality of the product his company turned out twenty years ago—but then a sudden shaft of gloom descends upon him. All that money spent on planning wall ovens, automatic controls, clock-timers, griddles, deep-fat fryers—all that money spent on advertising the remarkable new product features, styling, choice of colors. Why does his friend still *want* the old stove? Has he no feeling for progress? How could the company survive if everyone were happy with an old stove?

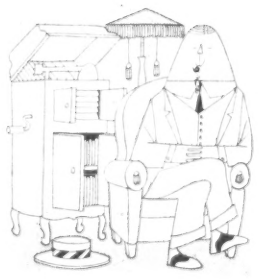
Goods, as J. K. Galbraith has recently pointed out in his book, *The Affluent Society,* are produced to be consumed—and "consumed," in this case, has a specific meaning. Once something has been "consumed," the value is gone out of it. Paintings in a museum can't be consumed by the patrons of the museum, because the paintings are as good as ever after the art lover has looked at them. However, what is left of a steak after you have eaten it isn't much use to anyone but a dog.

Between the imperishable work of art and the evanescent beef steak, there is, in a highly-developed community, a wide range of "durable" goods. The more durable the item, the more slowly it will be consumed and the fewer units any one consumer will require over a period of time. Coffins, to take a special case, are one to a customer. Manufacturers of durable goods must, therefore, sell most of their output to a limited market of first customers.

Theoretically, it would seem, there is nothing the manufacturer can do to remedy this situation. Once an item is produced and sold, its rate of consumption depends upon the use the consumer makes of it. Obviously, a manufacturer can't hope to make a five-year-old refrigerator or automobile as valueless as an eaten ice cream cone or a combusted gallon of gasoline. But a manufacturer *can* hope to increase the *apparent* rate of consumption of a durable item—and thus automatically increase his replacement market—if he makes his older product seem "obsolete." The trick isn't foolproof, but it ought to work a good part of the time—and perhaps it can even be planned, assuring the manufacturer of a large, steadily increasing replacement market. Such planning could proceed in three directions:

1. *Functional obsolescence:* Refrigerators are a good example. New refrigerators with effective, self-contained freezer compartments—and trouble-free automatic defrost mechanisms—make older refrigerators far less valuable, despite a great continuing consumption-potential. The addition of a new function and a new convenience are persuasive reasons for the market to discard old units still in perfect working order. The

Object lesson in obsolescence: Phonograph's humble beginnings . . .



. . . were soon eclipsed by imposing console models, which very soon . . .

more important the new function—or the more important it can be made to seem by advertising—the closer to "obsolete" the old units become, and the more willing consumers will be to replace what they have. When television sets with 21-inch screens first became available, many people discarded relatively new 17-inch sets.

2. *Style obsolescence:* The ladies' garment industry was, of course, the pioneer in this area. And the automobile industry has followed in its high-heeled footsteps, developing a kind of style obsolescence by social pressure. Upper-income elements of the market have been encouraged to believe that they are socially declassed if they are seen driving an old automobile. To make sure that the age of a car can be dated at a glance, models have been changed—superficially in most cases—every year. And the technique unquestionably has been effective in certain markets. There are communities in this country where a wealthy man can get a reputation for stinginess simply by driving an older car. It must be kept in mind that this situation is exclusively American. Citroen, in France, made an automobile that was exactly the same on the outside from 1938 to 1956. It is not possible to date a Jaguar, a Mercedes, a Rolls-Royce, or even a Volkswagen, simply by the appearance of the vehicle. In France, England, and Germany, productive capacity has remained below effective demand for automobiles. Thus the manufacturer has had no reason to attempt to heighten the consumption rate of his product.

3. *Materials failure:* Obviously, one way to increase the replacement market for durable goods would be to make products in such a manner that they would function less well as they got older. This area of possible planned obsolescence is so highly charged emotionally that it is virtually impossible to get accurate evidence of actual procedure—and positively libelous to suggest possible examples. Items which are made to wear out more quickly than they must are, by definition, shoddy goods. A manufacturer who puts his name on shoddy goods risks a destructive reaction from the market which could more than offset his possible gains from increased consumption.

Durability still sells

There are some areas, indeed, where durability is regarded as a major selling point. Fountain pens are still guaranteed "for life" or even "forever." One of the most effective advertisements appearing last year was for Zippo cigarette lighters, which offered free, unlimited repair service. The advertisement contained a strong appeal for social approval of craftsmanship for its own sake, and all the attendant value connotations of honesty, responsibility, and so forth.

Placing such subjective judgments to one side for the time being, it is clear that a pattern of successful style obsolescence must eventually be reinforced by a decrease in the durability of the product. There was a time in rural America when considerable quantities of clothing were passed down from mother to daughter. Certainly, women's garments could be made to be more durable than they are today. But if a dress is to be obsolete in five years, there is no sound economic reason to make it durable for ten. Indeed, under these conditions, the achievement of maximum durability for the product would be wasteful. If the decreased cost of making the less durable product is passed on to the consumer in the form of lower prices—which is likely in most situations—the "shoddy" product will be more attractive, not only in the market, but also by standards of community interest.

Such an analysis assumes that all members of the community feel style obsolescence at the same rate—an assumption which is not valid. There must be women somewhere who would be content to wear older fashions if the clothes held out. To the extent that the majority sense of obsolescence diminishes the durability of the available product, these women are discriminated against. It is this minority, presumably (there is also a political element here), that voices the complaints about defective workmanship which are fairly often lodged against the clothing industry.

Fins, fashion, and craftsmanship

Where such complaints are common, it is at least possible that goods are not being made for maximum durability. Thus the charge against the automobile industry is worthy of a hearing—especially since the evidence indicates that European cars, which are not produced under conditions of repeated style obsolescence, tend to give somewhat longer service. Except for the Rambler, which has done a minimum of restyling in recent years, no American make of automobile stresses durability as a major selling point. Dodge once concentrated its promotional fire in this area, but the 1959-model Dodge is

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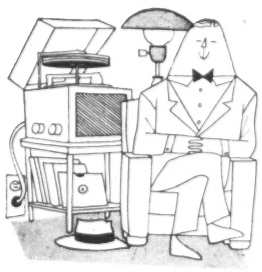
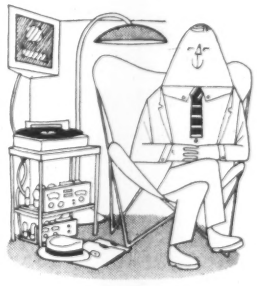
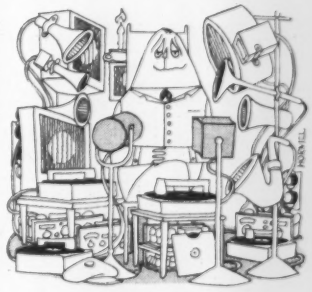


. . . yielded to the electric models. Then, only a short decade ago . . .



. . . the long-playing record ushered in the dawn of the hi-fi era . . .

Today we have stereophonic sound, and as technology marches on . . .



. . the consumer may soon vanish in the maze of his own home music system.

Getting Your Share of World Technology

MELVIN MANDELL, *Industrial Editor*

TO U.S. business men, accustomed to the idea of American scientific superiority, the notion of importing any technology from Europe may seem a bit strange. Yet today a growing list of companies are finding it both logical and profitable to do just that.

Before World War I, American science and technology was essentially a subsidiary of European technology, despite the brilliance of some American scientists and inventors.

By the beginning of World War II, however, the umbilical cord had been severed. Although all technology surged ahead under military stimulation, at the war's end American technology emerged preeminent and had to help rebuild a largely disorganized West European technical community, just as our economy helped to reconstruct shattered West European industry.

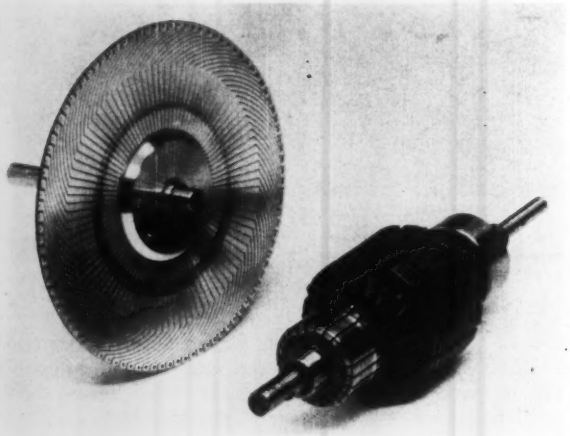
In the fourteen years since the war's end, European technology has rebounded with such vigor that American companies are once more offering tens of millions in cash or equivalent technology for the ideas and technical practices of European researchers, inventors, and engineers.

Importing technical ideas efficiently and speedily, either to strengthen existing products or to diversify into new fields, is now a growing concern of many leading American companies. To share in this vital technology, American executives are having to learn how to deal overseas for ideas. (It must be emphasized that the trade area is not just West Europe and Great Britain. We are already obtaining valuable technology from Japan, Israel, and Russia, and these and other nations outside of West Europe will eventually become even more important sources.) The balance of trade in technology is swinging away from the United States—and alert American manufacturers are taking advantage of the trend to acquire research results, products, and processes with a high payoff potential.

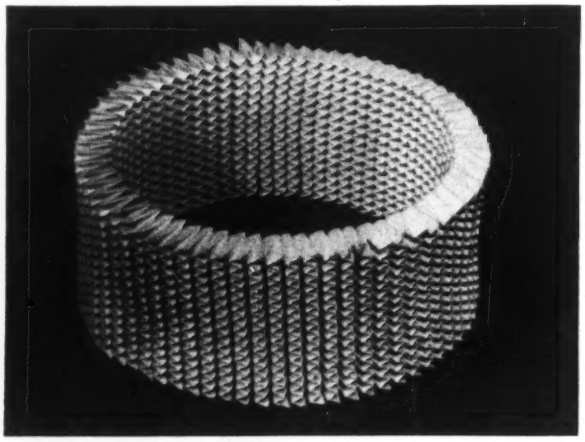
Although big companies have been searching overseas longer and harder, there's plenty left for smaller manufacturers. The plain fact is, big companies naturally look for different technology than do small concerns.

Why invest scarce capital and irreplaceable time in an R&D project if the work has already been done and the results are available abroad? Importing overseas technology may be an easy and profitable way for you to get the jump on competition.

Overseas Technology Was the Source of These Unusual Products



THE PRINTED-CONDUCTOR *armature, shown above left in comparison with a conventional armature, almost does away with the need for hand crafts in electric motor and generator manufacture, enabling any user of AC, DC, or servo motors to assemble his own motors. Of French origin, the armatures will be made by Photocircuits, Inc., Glen Cove, N.Y., and marketed by Printed Motors, Inc., New York.*



AN INGENIOUS *French folding machine that can handle paper, plastic or metal sheet, and mesh turns out this unusual corrugated material in either flat or cylindrical form. Initial use is for air or liquid filtration, but the form is also a disposable air impeller-filter or heat exchanger. It is also a good core for sandwich structural members. The corrugated forms are available from Chevroned Products, Inc., New York.*

They are mostly interested in mass-production, high-volume products or huge equipment such as nuclear reactors, leaving all sorts of specialty items, production machines, instruments, and related technology for smaller companies.

The experience of a medium-size manufacturer of heavy equipment illustrates the possible benefits of importing technology. This manufacturer was losing sales to a leading rival concern which had developed a sales-generating electrical attachment to its line of equipment. The company whose sales were dropping was unwilling or unable to license the new feature from the rival. Instead, the company president went to Europe to find some existing variation on the key feature. A Swedish manufacturer offered just what he wanted, and after a week of tough negotiation, a satisfactory licensing arrangement was set up.

Careful advance planning and investigation are necessary to determine what type of technology will most benefit a particular company and where it is most likely to be found overseas.

Read all about it

One of the simplest ways for a company to learn the lay of the land is by keeping abreast of developments reported in foreign trade journals and magazines in its particular field. To help the busy technical manager and company executive, already inundated with American trade magazines, several magazines and companies prepare English abstracts of articles published in leading overseas publications.

For example, Research Information Service, Inc., New York, issues monthly bulletins, broken down into fields of interest, abstracting the latest European patents and technical articles. U.S. trade journals also are providing broader coverage of foreign developments in technology.

Some well-traveled American scientists, such as Dr. Herman F. Mark, head of the Polymer Research Institute, Brooklyn, N.Y., will make non-exclusive reports on foreign research.

Alert companies also make a point of sending their executives to technical conferences held in the United States and attended by foreign representatives who may be prepared to negotiate licenses or to sell know-how to American companies. Many U.S. concerns make a practice of hiring these distinguished visitors to give lectures or to act as temporary consultants.

Besides the clues to idea prospecting contained in articles or abstracts or gleaned from visitors and travelers, it is possible to arrange licensing deals through the American representatives of overseas companies, individuals, and universities.

Middle men for hire

A few foreign companies handle licensing through branch offices in the United States. One such company is France's Compagnie Generale de Telegraphie sans Fil, which operates through its U.S. affiliate, American Radio Company.

But the majority of licensing agents are Americans representing foreign companies without American branches. They act as brokers, taking their fee from the overseas client. For the American manufacturer, they offer the advantage of screening out crackpot inventions and gimmicks. Marc Wood International, Inc., New York, for example, only handles devices that have already been proved commercially in the country of origin. At the same time, this concern has educated its overseas clients to ask for a realistic royalty instead of shooting for the moon.

Worth knowing about also is the National Research Development Corp., Washington 6, D.C., which represents an enormous pool of talent in Great Britain. NRDC is a quasi-governmental body, seeking to license the inventions of British government and university laboratories. Most of the products licensed so far to American manufacturers have been scientific, industrial, and agricultural equipment, plus a few drugs. Non-exclusive licenses with provision for cancellation if royalties fall below an agreed-on minimum usually are offered.

Companies in processing industries have access to another group of representatives of foreign interests. Some half-dozen American plant design and construction companies have obtained the U.S. rights to dozens of valuable overseas processes. Their business is not mainly in licensing the processes, but in building plants that utilize them.

In addition, they act as intermediaries between American and overseas

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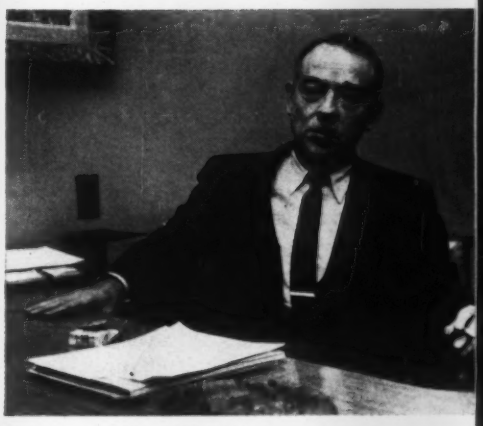
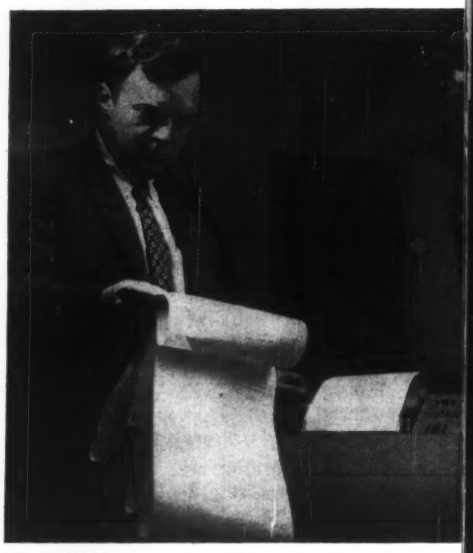


Brown of Scientific Design
"When technology is available for sale, purchase instead of development on your own can gain invaluable time in establishing a commercial position."

Coveney of A. D. Little
"Don't go overseas expecting to find bargain-priced technology."

Piore of IBM
"The idea prospector must have broad experience and mature judgment."

The meteorologist is proving a valuable addition to the planning team in many industries. Here is how his expert advice is helping to predict sales and reduce operating risks.



WEATHER DATA *gathered by the Civil Aeronautics Administration is scanned by G. W. Lunn, Pacific Gas & Electric meteorologist.*

Management Finds . . .

It Pays to Be Weather-Wise

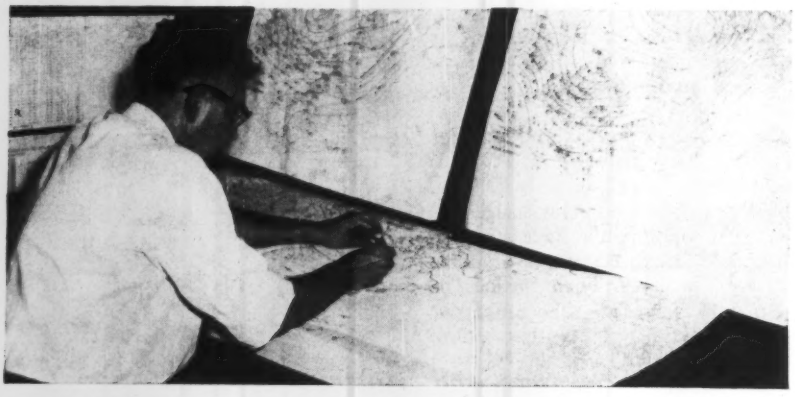
FRANK M. KLEILER

IF YOU ARE planning a sales campaign, choosing a location for a new plant, scheduling work to be done outdoors, or making any decision in which weather or climate is a consideration, a young science called applied meteorology can help you increase profits or reduce losses.

Some of the pioneers in this new field are working on ways to control the weather, while others are striving to develop reliable long-range forecasts for the business man—intriguing possibilities which may be realized before the end of this century. Meanwhile, in dozens of less spectacular ways expert weathermen are showing management how to cope more effectively with such variables in business planning as storms, heat, cold, and other weather conditions.

Most business men rely on the U. S. Government for what they need to know about the weather, but at least 100 companies have one or more meteorologists on their payrolls; at least 1,000 other companies regularly use the services of one of the 27 firms of consulting meteorologists.

Private weathermen first appeared about 30 years ago when the growing commercial airlines found they needed to supplement the weather information and advice offered by the U.S. Weather Bureau. A few consultants began selling their services to other industries soon after the airline weathermen proved their worth, but it was not until after World War II that the science or technology of industrial meteorology passed its adolescence.



SIXTY MAPS *like this are drawn every 24 hours at National Weather Analysis Center, Suitland, Md., for distribution to private subscribers and Government forecasters.*

Wartime skills in mufti

During the war, when there was an urgent need for maximum production, the U.S. Weather Bureau began supplying consultant and individualized advisory services to war industries. The executives in such industries, having learned how to use

weather advice, did not want to do without it after they returned to peacetime production. At the same time, hundreds of meteorologists who had been recruited or trained by the armed forces to assist in the planning of military movements returned to civilian life and soon adapted the techniques of forecasting for landings and pin-point bombings to handling the weather problems of meat packers, truckers, department stores, construction contractors, and manufacturing industries.

Prophets for profit's sake

The oil industry today uses weather experts in a wide variety of ways. Their weathermen help in exploring for new wells in Canada's sub-zero Winters and in marketing insect sprays on tropical islands. But their most important function is temperature forecasting for the production and distribution of fuel oil. "Operations in Summer, Fall, and early Winter," explains Vice President W. J. Sweeney of Esso Research and Engineering Company, "must necessarily be based on estimates of how cold the forthcoming heating season will be." Homes throughout the country use about 450 million barrels of oil for heating. The big job is to figure out—as far ahead as possible—just where and how much fuel will be needed.

Lockheed Aircraft Corp. employs meteorologists in engineering and development, airframe manufacturing, sales engineering, and plant design, but it is in operations research that they make their most important contribution, says R. D. Roche of Lockheed's Military Research Engineering Division. Lockheed is now in the 1965–75 planning area. Its scientists, looking so far into the future, pushing higher and higher into the stratosphere, and planning space-flights, must have the services of the top experts in applied meteorology.

Sales move with the mercury

E. I. du Pont de Nemours & Company has found that paint sales climb when the temperature hits 60°; half the anti-freeze is sold with the first cold snap in any area; a wet Spring spurs demand for fungicide. The company, therefore, keeps its production and marketing executives weather-conscious all year round. But its four staff meteorologists are used primarily for severe weather advisories. Each of the Du Pont plants has established certain weather limits which require emergency action when reached. At the Chambers Works, certain process lines must be protected when the temperature goes below 25°, construction and maintenance work on roofs and scaffolds must stop when winds exceed 25 miles an hour, the plant must be protected by sandbags when the tide at Deepwater Point on the Delaware River rises three feet above normal, and more than two inches of snow requires the clearing of roads and railway tracks. The company's weather advisory service warns plant executives when these critical situations threaten.

Almost every large gas company now has one or more trained weathermen on the payroll or consultants under contract because temperature, wind, sky cover, and precipitation affect customer demand. Pacific Gas and Electric has used meteorologists ever since 1937, when two unanticipated cold waves hit California in one month and caught the company without enough gas to supply all its customers' needs. Today, the company must anticipate changes in customer demand 24 to 40 hours in advance in order to make the necessary changes in the field production of natural gas. The utility's four weathermen work closely with the dispatchers who regulate the flow of gas from 60 field sources to the load centers. They also supply advice to operating and staff executives on plant design, construction jobs, air pollution, and the use of manpower.

A case of poison ivy

Although applied meteorology is a young science, its practitioners already are specialized in various branches. A pharmaceutical company wanted a study of the effects of weather and climate on its sales of medication for poison ivy and hay fever. It turned to Weather Trends, Inc., a firm of consultants who concentrate on marketing. Weather Trends determined what elements were favorable and unfavorable for an "early season" and "heavy incidence." It then advised the client when and where to launch promotion efforts for these two products.

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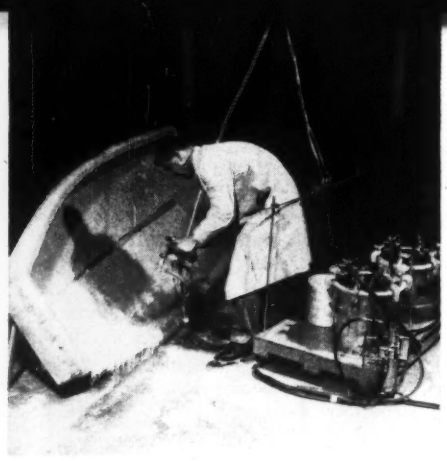
The Weatherman's Role on the Du Pont Team

Weather information is vital to many operations at E. I. du Pont de Nemours & Company plants. Left, George Collins, meteorological engineer, telephones advice to one of sixteen plants which depend on him to evaluate U.S. Weather Bureau data Teletyped to the Du Pont office at Wilmington, Del. Climate studies led Du Pont to locate its paint testing facilities (center) at Hialeah, Fla., where the days are generally hot and fair. A rain warning (right) sends a Du Pont crew at the Seaford, Del., plant scurrying to throw a protective covering around empty nylon barrels which could not be used if allowed to get wet.

ONE-PIECE CONSTRUCTION: *Instead of assembling compact railroad car washrooms out of many pieces, Budd Corp., Philadelphia, forms them in one big structure of reinforced fiber glass. Complete stairwells are also made in the same way.*

MATERIALS HANDLING: *Making up a pallet-load with pressure-sensitive tape reinforced with many long, parallel glass fibers. These tapes take as much as 500 pounds load per inch of width. They can often replace metal strapping for smaller loads.*



LOW FABRICATION COSTS: *Until this Rand spray gun was invented, "laying-up" glass fiber mats or cloth used in large reinforced plastic structures was a laborious job. Gun sprays fibers, binder, and binder-hardener all at once, nearly halving cost.*

STRETCHED GLASS:

New Twists in Product Design and Fabrication

INDUSTRY HAS developed a healthy appetite of late for a raw material that has been around for years—glass fibers. Last year sales of these tough, flexible strands ran more than 10 per cent ahead of 1957 sales, and this year another 15 per cent jump seems to be in the cards.

Why this comparatively sudden yen for a familiar material? (The Phoenicians spun the first glass fibers 3,000 years ago, but spun glass did not become an industrial material until 1938.) Actually, there are a number of reasons:

- The development of new fabrication techniques—such as spray guns—which cut hand labor costs in using glass-reinforced plastics.
- A growing interest in the corrosion-resistant and maintenance-free qualities of products made with glass fibers.
- The use of glass fibers in products ranging in size from minute retainer rings for pinhead-size bearings to 48-foot sailboats.

By far the greatest proportion of the annual production of glass fiber goes into plastics and other materials for reinforcement, but a substantial amount is converted into fireproof industrial and consumer fabrics, air and liquid filters, insect screening, and insulation.

Glass fiber's other jobs

Many materials besides plastics are strengthened with glass fibers. These include:

- paper
- pressure-sensitive tape (see photo)
- gypsum board (only about ¼ of 1 per cent by weight)
- urethane foam (5 per cent by weight greatly improves compressive strength—valuable in shock absorbers.)
- fiber board

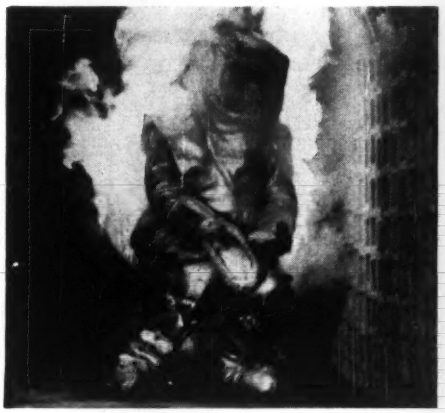
The reason for the booming sales of the glass-reinforced plastics (168 million pounds in 1957, up 20 per cent over 1956) is obvious: they offer industry an attractive, easily fabricated, corrosion- and impact-resistant material with a high strength-to-weight ratio. (Other important properties of glass-reinforced plastics are listed in the box below.)

The material, available in untinted

The Selling Points

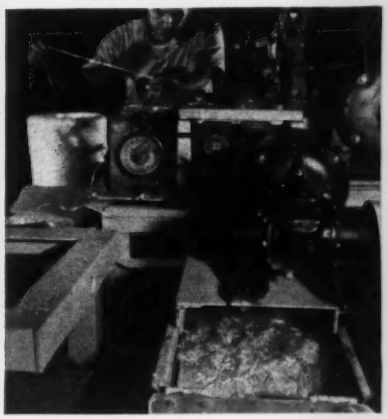
Besides high corrosion and impact resistance, combined with a high strength-to-weight ratio, fiber glass reinforced plastics have these valuable properties and advantages:

- **Resistance to fungus growth**
- **Little undesirable aging**
- **Ability to polarize light**
- **Good weathering resistance**
- **Fire-resistance**
- **Transparency to radio waves (the 3-ton radome on the latest radar picket is made of glass-reinforced plastic)**
- **Electrical and heat insulation**
- **Elimination of seams**
- **Ability to hold molded-in metal fittings**
- **Little water absorbency**
- **Sound absorbency**
- **Attractive textures and surfaces on one or both sides of the product**



DRESSED FOR HEAT: *The temperature inside this furnace is 1,600° F, yet this repairman was able to make hot repairs for 90 seconds. His aluminized fabric suit, lined with fiber glass insulation, is made by Minnesota Mining and Manufacturing.*

HOT SEAT: *A rough "preform" of glass fibers and resin binder enters a curing oven at Winner Manufacturing Company, a custom fabricator. Next, the cured preform is molded in heated, matched steel dies into a chair seat for Knolls Associates.*



X INGREDIENT: *Glass fibers can be added to many products to increase strength at small cost. Here, wisps are continuously chopped into the slurry that is baked into Barrett wall board. The input strands in the inspector's hands are fiber glass roving.*

translucent form and a number of colors, also has a lot of sales appeal. Although it is generally, but not necessarily, more expensive than competing materials, such as sheet metal, lower maintenance costs often make it cheaper or more appealing in the long run.

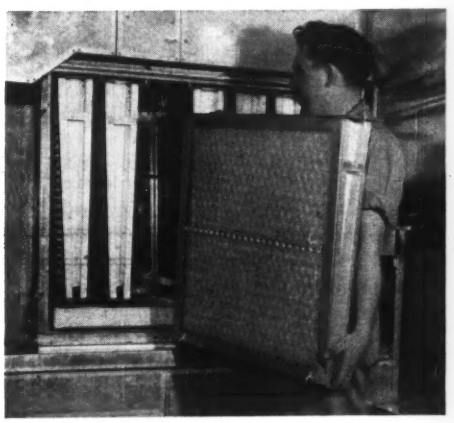
The disadvantages of glass-reinforced plastics, especially in comparison to metals, are increased production time, comparatively high scrap losses, and possible warping. The first disadvantage is a particular handicap in mass-production industries and helps account for the far greater application of reinforced plastics in short run, low production products, such as special bodies or cabs for trucks.

Glass fibers are used for reinforcing in two ways: some in the cloth form, but mainly in the loose fiber form. Some fiber glass cloth is wrapped around the outside of fragile pipes for protection. For example, National Carbon Company wraps its carbon and graphite piping with fiber-glass cloth, then binds the composite structure with tough resins.

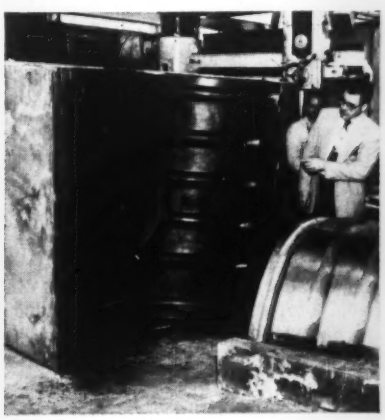
Until last year, the only way some 400 manufacturers could make boats, Army pontoons, and other large objects out of fiber glass was by the laborious "hand lay-up" method. Large blankets of fiber glass cloth mat were laid down in an open mold and given a time-consuming application of the resin binder.

Now two guns are on the market which spray glass fibers, resin, and resin-hardener in proper proportion into the mold (see photo). The first gun was invented at the Rand Development Corp., Cleveland, and more than 100 are now in use in industry under license. Gusmer, Inc., Woodbridge, N.J., makes the other, which sells for $3,500 with controls. Rand claims that their gun not only speeds up production and cuts costs by as much as 40 per cent over the hand lay-up technique, but results in a stronger structure.

Factories suffering high maintenance costs or even structural damage due to corrosive atmospheres also can use the Rand gun to coat entire walls, ceilings, and columns with corrosion-resistant plastics reinforced with glass fibers. *continued on page 62*



FILTRATION: *Glass fibers are used to filter air in homes and factories and to filter liquids in laboratories and chemical plants. Here is one of the seven Fiberglas filters in the compact, high-capacity air conditioning system of the Boeing Stratocruiser.*



HEAVY DUTY: *One of the largest drop-hammer dies ever made at Republic Aviation, this huge die is capped with 450 pounds of Shell epoxy reinforced with glass fibers. When not in use, it can be stored outdoors. These dies are for short runs.*

GRIDDLE CAKES: *The latest in reinforced plastics is this open grid construction. The grid is formed flat, then cured into a chair in a mold, as shown here at Winx Products. Key element is a new flexible U. S. Rubber binder. Other uses include vent covers.*

Managing Your Inventories for Profit

ROBERT H. HINCK

A real shock often awaits the company president who decides to "look into this inventory problem." All too frequently, overloaded, ill-managed inventories are a needlessly heavy drain on precious working capital.

NOT LONG AGO, the top executive of a Midwest steel fabricating concern called his key aides on the carpet to get at the root of an alarming inventory problem. "Gentlemen," he said, picking up the treasurer's report that lay on his desk, "you know why I called this meeting. This growth in our inventories is an insidious thing, and it's getting badly out of hand. I know we've got to give our customers fast service, but it's costing us more to carry these stocks than some of our accounts are worth. Frankly, I'm worried. You'll be too when you hear what Marvin says here about our profit outlook for the year. I'm convinced we've got to act fast to correct this situation. But first I think we've got to agree on our objectives. Bill, what do you think should be the goal of our inventory policy?"

"Customer service," the vice president for sales answered promptly. It was necessary to keep a complete line in stock to meet customer demand and to maintain the company's position as a leader in the industry, he contended.

The vice president for manufacturing nodded in agreement. But, he added, the main objective should be keeping manufacturing costs down. Long runs lowered unit costs, and stock build-ups during the slack season kept production steady and efficient, he pointed out.

The traffic manager was more concerned about lowering shipping costs. He recommended a multi-warehouse system with adequate inventories which would reduce shipping charges by making possible more low-cost bulk shipments.

But the treasurer maintained that the company simply couldn't afford to have so much money tied up in inventories. He warned that the company's financial ratios were off and that too much money was being wasted on interest payments on loans and write-offs on obsolete items.

All of which confirmed the president's suspicion that a basic conflict of objectives lay at the root of the problem. Unquestionably, every one of these men had hit the target, but none had hit the bulls-eye—maximum profits.

Many companies, caught in this same sort of costly confusion, have found the way out through a positive, company-wide approach to inventory management—an integrated program which cuts across all organizational lines and not only stops the drain on the company treasury, but actually boosts the profit potential of products.

The danger of allowing inventories to become heavy with surplus and obsolete items has long been recognized. The annals of business failures contain many examples of companies forced out of business as a result of speculative inventory build-ups. Properly managed companies avoid this type of inventory excess, which can lead to insolvency. But in these days of narrowing profit margins, many executives recognize that the negative approach of simply curbing inventory speculation is not enough. They are

becoming aware of the need for a more positive approach to inventory management. This means careful evaluation of the greatest profit yield obtainable on the inventory investment—which, according to a recent study by the National Industrial Conference Board, represents nearly 30 per cent of the working capital of the average business.

The reasons why

There are plenty of good reasons why better inventory management is fast becoming a vital necessity.

- Rising interest rates have made it more costly to finance inventories. This problem has been accentuated by rising costs and expanding volume.
- Added emphasis has been placed on changes in style and design. This can lead to faster obsolescence of inventories.
- There has been a trend toward automation in the office, with accompanying application of operations research techniques.
- Users of products have become more selective, and where the "value analysis" purchasing technique is employed, have insisted on products designed for a specific use, rather than the standardized product. For suppliers this has meant broader product lines and an increase in the number of slow-moving items. But it has also meant that the user has had to maintain a larger inventory of special items.
- Many companies have broadened their product lines to match all items sold by competitors. This practice increases the possibility of obsolete stocks, as well as the number of slow-moving items.
- Diversification has also increased the number of inventory items carried.
- Users, desiring to keep their own inventories at a minimum, want faster and more frequent shipments from suppliers. This has prompted suppliers to increase their inventories both in quantity and in number of items carried. In many instances, elaborate branch warehouse systems, which lower over-all turnover rates, have been established.
- Manufacturing companies have undertaken large facilities improvement programs. Most new machines have automatic features which result in high set-up costs but lower unit costs. The economic use of such equipment calls for longer production runs which increase inventories.

continued on page 84

How to Cut Inventory Costs— A Top Management Checklist

Are poorly managed inventories causing a needless drain on your company's profits? Here is a checklist of good inventory practices which can help you determine whether you are taking full advantage of the many ways in which efficient, integrated inventory control can cut costs and boost profit potentials.

✔ **Responsibility for inventory management**
Is responsibility for inventory management policies placed with an executive who has sufficient organizational stature and experience? Does he have an over-all, objective approach?

✔ **Inventory carrying charges**
Are inventory carrying charges known? Are they for individual items? Are they all-inclusive?

✔ **Total distribution costs**
Do profit margin computations include distribution costs? Do they include inventory carrying charges? Are turnover rates of individual items considered in applying these charges?

✔ **Scientifically determined order points**
Are statistical laws of probability considered in establishing order points?

✔ **Economic manufacturing and procurement lots**
Are order quantities based on economic lot formulas which give consideration to inventory carrying costs, set-up charges, and volume discounts?

✔ **Good internal communications**
Is manufacturing informed of latest sales trends and forecasts? Are order quantities and production schedules based on sales information less than one week old? Does engineering keep manufacturing up-to-date on design changes and engineering schedules?

✔ **Fullest use of modern office techniques**
Is modern office equipment used for fastest internal communications? Is it used to apply operations research techniques to inventory management? Are inventory records fully integrated with sales analysis, order processing, invoicing production control, and accounting procedures?

✔ **Stock levels based on forecasts**
Are forecasts used to determine order points and order quantities, instead of past usage history?

✔ **Branch warehouses**
Are total inventory carrying charges included in branch warehouse cost analyses?

✔ **Consolidation of manufacturing activities**
Are inventory carrying charges included in analyses of centralized vs. decentralized plant locations?

✔ **Premium transportation**
Are the savings resulting from inventory reductions considered in evaluating the benefits of faster, more expensive methods of shipment?

✔ **Break-even points**
In establishing selling prices in distant markets, is consideration given to the fact that increased volume will improve inventory turnover and reduce unit inventory carrying charges?

✔ **Good shop planning**
Will better shop planning reduce work-in-process cycles and inventories? Shortened lead times will permit reductions in finished goods safety stocks.

✔ **Production schedule flexibility**
Will the use of second, third, and fourth shifts increase profits by reducing work-in-process and finished goods inventories in addition to absorbing more fixed manufacturing burden?

✔ **Bulk stocking of semi-finished items**
Are items which are similar except for final operations bulk-stocked to reduce finished goods inventories?

✔ **Use of subcontractors**
Is the inventory aspect of sub-contracting considered in arriving at make-or-buy decisions? Are sub-contractors used during peak periods to keep work-in-process cycles and lead time short, permitting lower finished goods stock levels and lower work-in-process and raw materials inventories?

✔ **Standardization of parts and materials**
Does engineering achieve fullest possible standardization in bills of material? Have maintenance department stocks been screened to eliminate duplications of similar parts supplied by equipment manufacturers?

✔ **Preventive maintenance programs**
Are forecasted requirements for maintenance spares based on a preventive maintenance program rather than past usage?

✔ **Scheduled deliveries**
Does Purchasing schedule deliveries from suppliers to take advantage of volume discounts on a total order?

✔ **Obsolete and surplus items**
Are obsolete and surplus items marked down promptly to reduce tax payments, making capital funds available to reduce outstanding debt?

SHIPMENTS *to customers are made today on a wide variety of selling terms.*

What's Happening to Selling Terms?

RICHARD SANZO

Facts from a new survey of manufacturers and wholesalers show a varied pattern of trends, a tendency toward increased use of selling terms as a competitive device in some lines.

THE GREAT VARIETY of selling terms now in use is symptomatic of the somewhat chaotic situation surrounding the entire question of terms of sale in today's marketplace.

In a study of the terms and conditions of sale made last Spring by DUN & BRADSTREET, it was found that 1,600 business concerns in 94 manufacturing industries and 75 wholesale trades use as many as 45 separate and distinct types of open account terms of sale. Generally, the range of cash discounts is from zero to 8 per cent (it might be argued that cash discounts in excess of 4 per cent are not cash discounts at all, but trade discounts). Maturities on net terms run the gamut from seven to 90 days, and longer in rare instances. In most cases, maturities run from 30 to 60 days.

This is not surprising, for terms of sale are part of the mechanism of credit—and credit is an instrument of sales. Variety of selling methods is to be expected in an economy which rewards new and workable techniques in sales promotion.

In this country, there exist several thousand distinctly different lines of business, and terms of sale naturally vary from one industry to another.

Variety is the rule

What is rather startling about the results of the DUN & BRADSTREET study is the fact that variety has come to be a characteristic of terms within individual lines of business. For example, the survey shows that 20 per cent of all manufacturers and 26 per cent of all wholesalers surveyed are quoting two sets of selling terms, while 7 per cent of all concerns surveyed report three sets of terms, and an additional 4 per cent say they are selling on more than three sets of terms. In short, nearly one concern in every three, or 32.7 per cent of the 1,600 concerns consulted, report that they grant credit on more than one type of selling terms.

More than 45 years ago, this question of variety of terms was a problem. An article in the *Credit Men's Bulletin* written in 1912 offered this bit of vexation:

"What a variety of terms we have! Bar iron and short bows are net; axles are 1 per cent; leather, 2; wheels, 3; carpeting, 4; rubber, 5; paint, 6; and so on. Time for discount runs ten days, fifteen, 30, 60, and Harvester Trust will allow on goods carried over the cash discount nearly or quite one year after shipment. What a medley! What demoralization!"

It should be remembered that when this was written the automobile was still a novelty, the airplane a miracle, the tempo of business leisurely, million-dollar concerns a rarity, and standardization in methods of doing business virtually unknown. It is interesting to compare the quotation with the remarks of a credit manager made in 1958:

> In our industry, the subject of cash discount has been considered an element of price, and thus we have never been able to do anything about it for fear the cops will come breathing down our neck.
>
> We have, in our business, nineteen different types of payment. In a country in

Mr. Sanzo is a staff analyst for DUN & BRADSTREET, INC.

PERIOD OR DATE WHEN DISCOUNT MAY BE TAKEN

Percentage of concerns surveyed which grant cash discounts

	Manufacturers	Wholesalers
5 days*	0.3	1.1
10 days*	63.2	39.3
15 days*	2.2	2.2
20 days*	1.0	0.0
30 days*	3.3	3.7
10th and 25th of the month	4.8	1.1
10th of the following month	24.0	51.5
15th of the following month	1.2	1.1

*After date of invoice, shipment, or delivery

which standardization is responsible for fantastic advances in mass production, it certainly seems a bit pitiful that few people can agree on the premium which should be available for the advantage of high turnover.

Although we have quite an assortment of terms, we cannot assort them on a single invoice, even though products with varying terms may be shipped on a single consignment. It is quite necessary to segregate billings by terms for the reason that customers will invariably use the most advantageous terms on the invoice, and, by the time charge backs and phone calls and correspondence have been handled, the shipment is wrapped up in a ten dollar bill anyway.

Here, in short, is one indication of the trouble and turmoil which is characteristic of present-day selling terms. With the exception of a handful of industries — sugar, meat, apparel, printing, steel, transportation—we seem to be moving more and more away from uniformity of terms within individual industries.

Exceptions are the rule

Back in 1947, DUN & BRADSTREET issued the first of a series of folders outlining the prevailing terms of sale in 78 lines of business activity. This folder has been revised eleven times within the past eleven years. In 1947 it was possible to state with reasonable assurance what the prevailing terms were within these 78 lines of business. It is becoming increasingly difficult to do so. More and more, it becomes necessary to make the qualification that such and such are the *predominant* terms for a particular industry and that there are many exceptions.

Moreover, checking back over a space of 50 years of credit practice, it is astonishing to find that most of the issues which involved selling terms then are still being hotly debated today. In the early 1900's, credit men talked and wrote about whether or not it was feasible to charge interest on past due accounts; whether or not the granting of cash discounts was economically justified. They complained of discount chiselling by customers. They spoke wrathfully of the way in which large customers were prone to take advantage of their position in ignoring stated terms of sale. They yearned wistfully for the time when credit groups could take concerted action to enforce stated terms. Exactly the same complaints are being made today. A credit man replying to the DUN & BRADSTREET survey states, for example, that he considers cash discount "nothing more than a tribute tendered to a customer for the purpose of ransoming kidnapped money."

Why this continuing restlessness? Why don't credit practices in fixing and enforcing terms of sale simmer down? Why are some of the old issues involving selling terms constantly popping up instead of being consigned to a decent burial? What's happening to terms of sale?

The answer, quite simply, is that terms of sale are changing as they have always changed. Change is the characteristic pattern of selling terms. The nature of the change was one of gradual evolution during the 19th century and one of spasmodic upheaval and mutation at various intervals since 1900. These changes have been influenced sharply by developments growing out of two world wars, combined with the aftermath of business booms and business setbacks which followed these wars.

The pattern of change

Selling terms have changed since 1946. They are changing today more and more rapidly than at any time in the history of the country. While the fact of change is interesting in itself, it is more important to discover *why* and *how* terms are changing, and how they are likely to change in the future.

The question of *why* terms have changed must be divided into two major parts, each of which has a bearing on the other. Briefly, terms have changed partly as a matter of evolution in time and partly for reasons of adaptation to prevailing business conditions.

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DATES WHEN TRADE OBLIGATIONS FALL DUE ON NET TERMS

Percentage of concerns surveyed

	Manufacturers	Wholesalers
7 days*	1.7	2.4
10 days*	6.2	5.7
15 days*	0.9	0.0
30 days*	62.2	37.7
45 days*	0.6	0.8
60 days*	2.7	5.4
70 days*	0.3	0.8
10th and 25th of the month	1.7	1.1
10th of the following month	22.1	43.4
15th of the following month	1.3	1.9
20th of the following month	0.3	0.8

*After date of invoice, shipment, or delivery

Northrop's PACE Program:

New Cost-Cutting Tool for Management

OBSERVER IN ACTION: *Touring an office at Northrop Aircraft, PACE Observer Joe Parks can sum up at a glance the effort rating of an entire row of workers.*

A California aircraft maker has come up with a practical way of measuring work pace in non-production jobs that have baffled the time-study men.

WHEN the big boss strolls into a department and finds a gang around the water cooler discussing the latest gyration of the stock market, three typists away from their desks and a fourth doing her nails, he's likely to conclude that the whole group should be out on its ear—and the department head right on the pavement alongside them. Or could it be that he happened along at an unusual as well as unfortunate moment—a pause in the day's occupation the like of which hadn't occurred in months?

Wanted: a yardstick

Chances are, there's no way he can tell. Tempo in the office cannot be machine-paced as it is in many factory jobs. And, except in the case of routine work, it is generally impractical to use time study or work counts. Yet work pace in the office is becoming more and more important to company and national productivity. The ratio of office and technical workers to production workers is rising—and will continue to rise, if informed predictions hold good. And tempo is a difficult thing to change. When the whole office is moving along at a fast clip, new workers take their cue from the more experienced and keep step as a matter of course. If the pace is a leisurely walk, or even a slow crawl, the same thing happens.

Norair, a division of the Northrop Corp., Hawthorne, Calif., believes it has the answer to these problems and with it a valuable measure of supervisory performance. And it has productivity figures to back up its claim.

That answer—basically a method of measuring group rather than individual effort—is what Northrop calls its Performance and Cost Evaluation Program, or PACE for short. Norair is currently applying it to such non-shop operations as tool design, purchasing, accounting, manufacturing control, manufacturing engineering, and planning and scheduling. Adaptation of PACE to the engineering department is well along, and contract administration is due for a study soon. The plan is also being applied to Norair's factory operations, most of which are unsuited to conventional methods of work measurement.

The plan was developed at the instance of Richard R. Nolan, vice president and general manager of the division. What Nolan asked for was some way of measuring work tempo that would show when, where, and how much it was fluctuating, and why. F. W. Lloyd, the division's manufacturing vice president, put an industrial engineering team on the job, and after months of research they came up with a satisfactory program. This team, which still directs PACE operations, is headed by David N. Petersen, Norair's supervisor of manufacturing methods engineerings.

PACE doesn't involve stop watches, because its objective is to measure not

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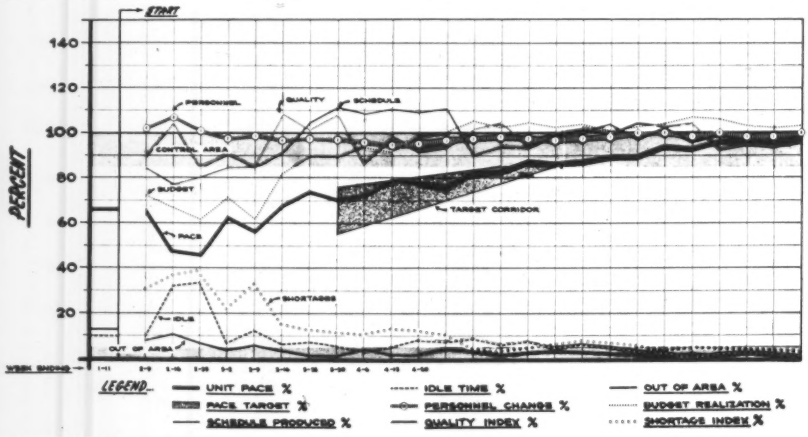
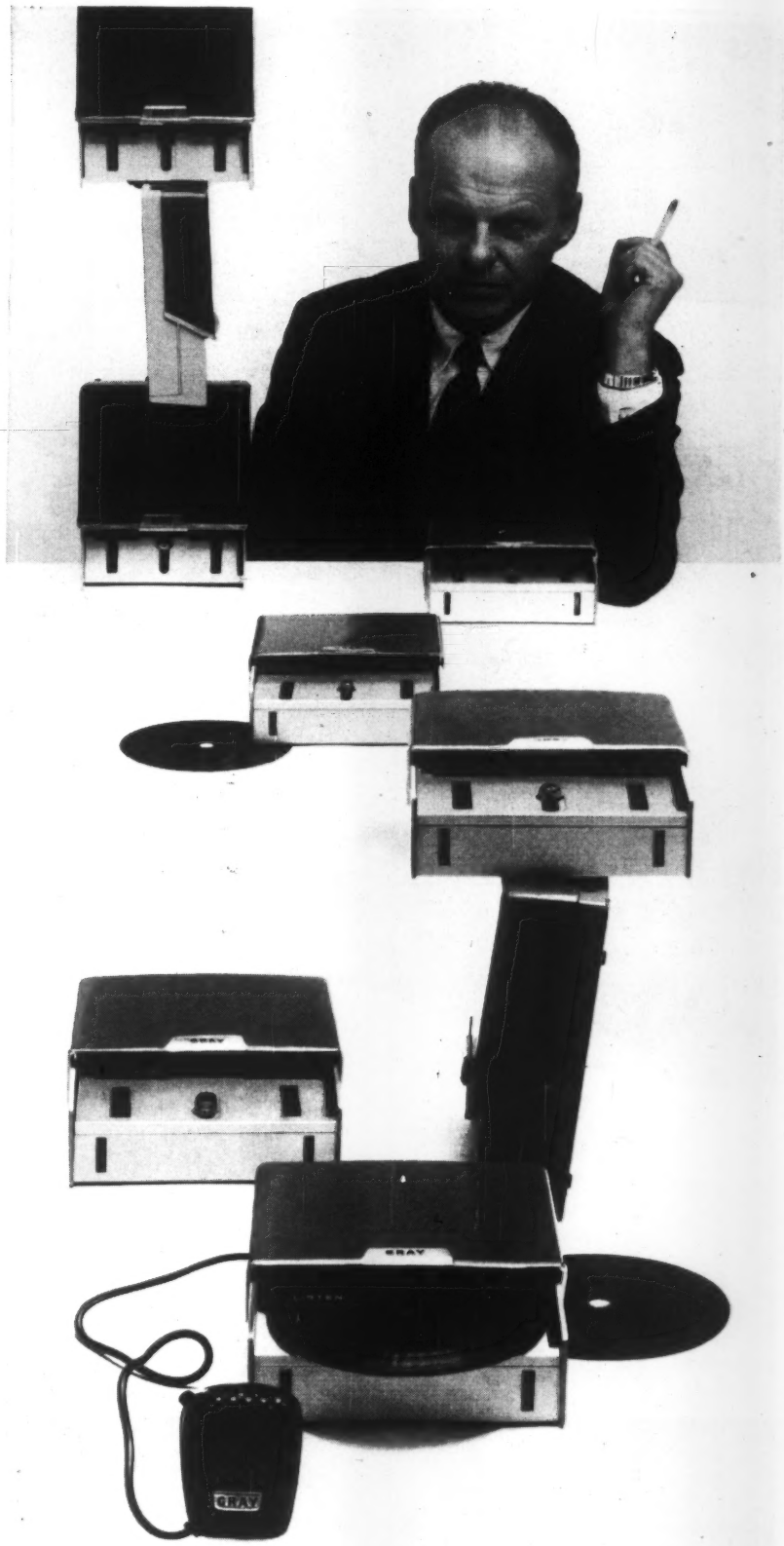


SAMPLE PACE REPORT: *This graph, which shows the group performance of a sample department at Northrop over a 25-week period, charts eight auxiliary indexes in addition to the basic PACE index (heavy black line). Note how quality, idle time, shortages, schedule produced, etc., gradually converge in the "control area."*



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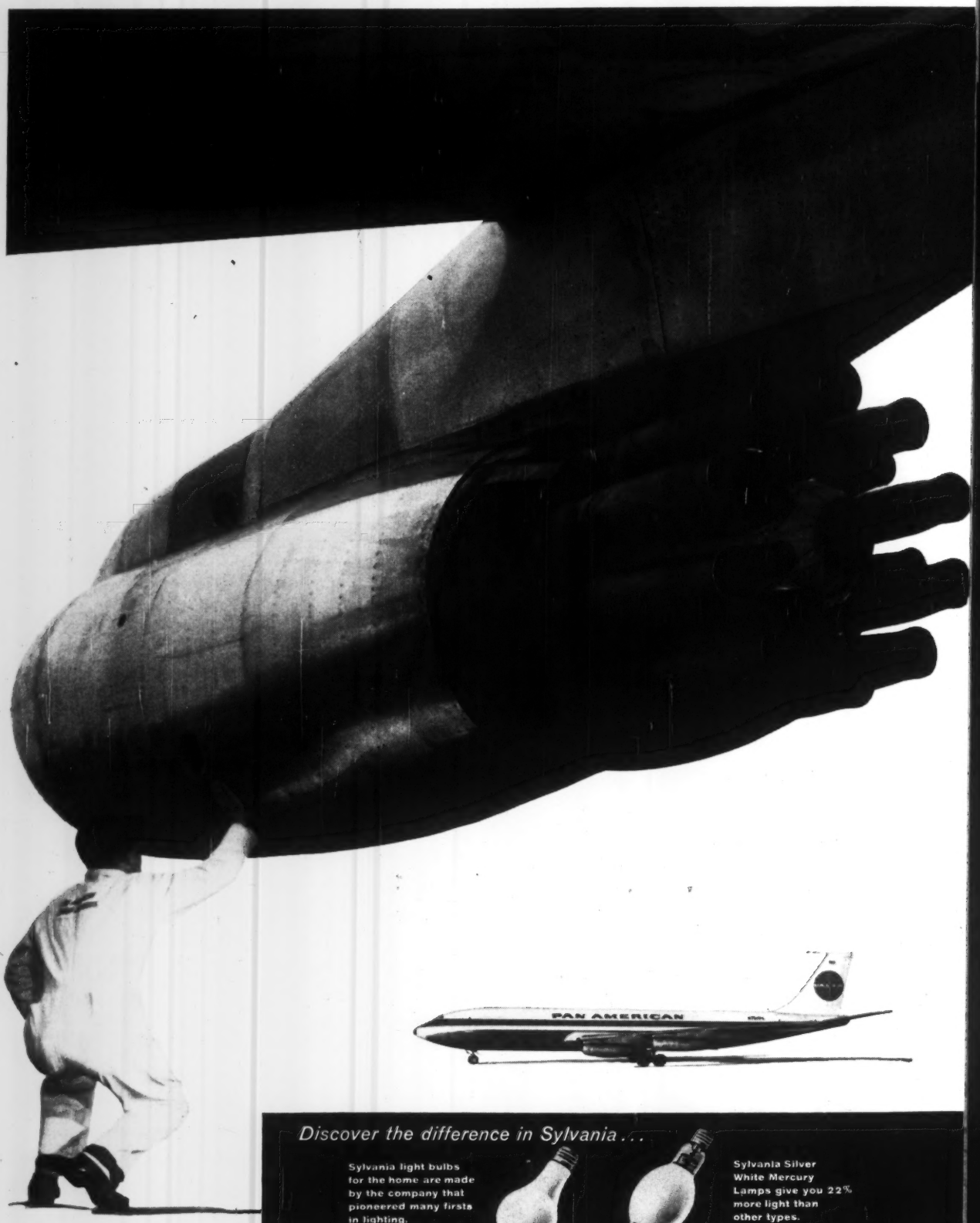

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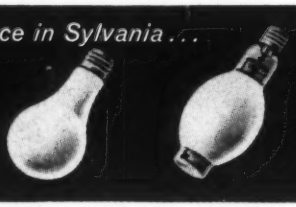

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—Willis G. Lipscomb, Vice President, Traffic and Sales, Pan American World Airways

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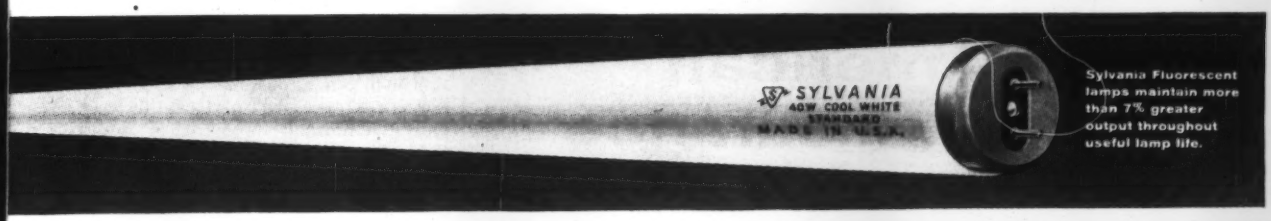
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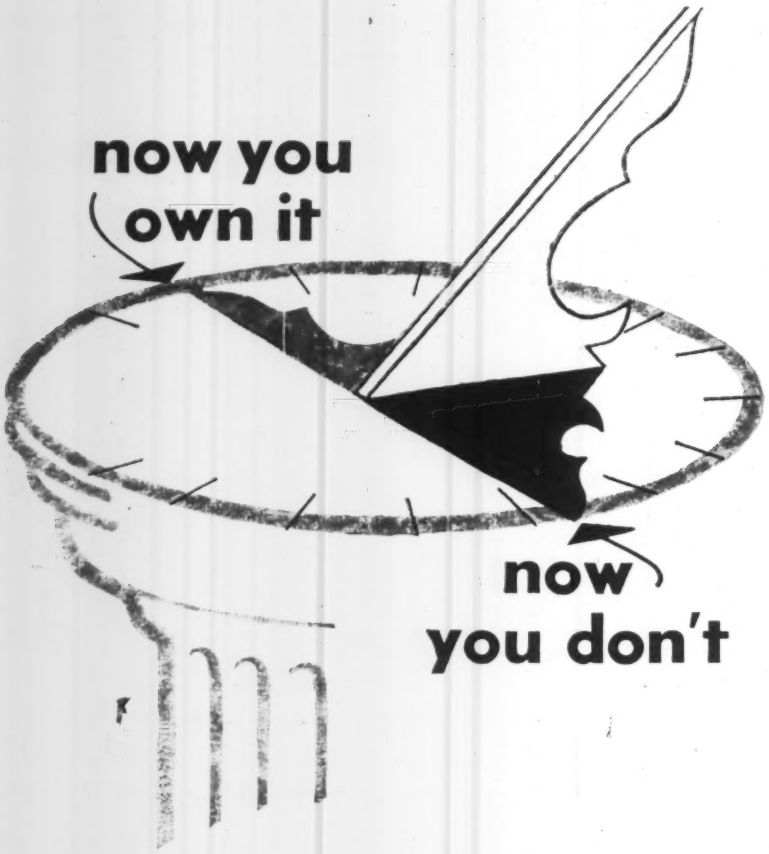

You insure it when you own it
...why not when you don't?

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individual performance but the more intangible tempo of the group. Instead, the plan relies on observations and random sampling, to produce a "PACE index," and reinforces it by such measures as a budget realization index (ratio of earned hours to actual) and a personnel index (ratio of department population for the current week to the population during a base week. As pace—and PACE—improves, fewer people should be needed to do a given task if other factors are equal. As the personnel index goes down, the PACE index is likely to be going up.)

The work samplings are conducted by observers who are familiar with the basic departmental operations and have also gone through special two-week studies of the systems and procedures used by the department they are to study. One observer can adequately cover about 750 employees on his rounds.

The observer's function

Each observer tours the department several times a day on a random schedule, taking a different route each time. As he proceeds he notes: (1) the number of people idle—that is, completely inactive or engaged in such extraneous activity as doing crossword puzzles, figuring out their income taxes, or standing around the water cooler; and (2) the number out of the area. Then he evaluates group effort as a whole, assigning a rating based on his informed judgment of how the group's current work effort would compare, in percentage terms, with optimum normal effort —i.e., the known, average sustained effort of an efficient worker.

In measuring office and technical groups it is recognized that personnel are not necessarily off the job when they are out of the area, since consultation with others outside the department may be a necessary part of the work. Only "abnormal" amounts of out-of-area office time go into the calculations, and the observer—from his own knowledge of the job and from the research

Figuring the PACE Rate

The observer's findings in each department are combined by the following formula:

$$\frac{[N \pm L - (I + A)] \times E \times 100}{N \pm L} = P\%$$

That is, the number of workers is computed by taking the number assigned (N) plus or minus loans (L) minus the number idle (I) and absent from the area (A). This figure is multiplied by the effort rate (E) times 100, and the product is then divided by the number assigned plus or minus loans. This gives the PACE percentage.

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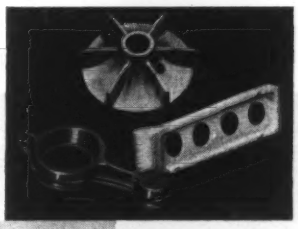

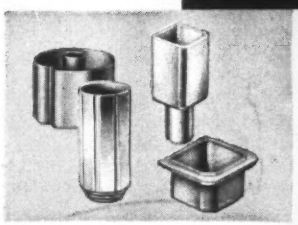

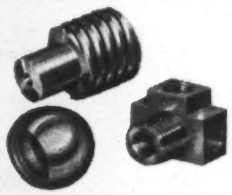

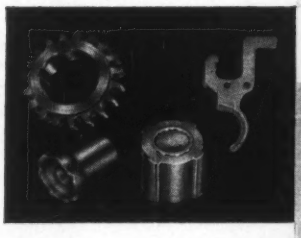

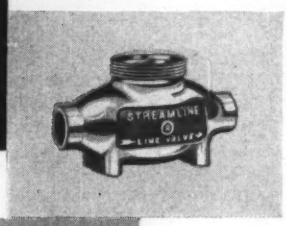

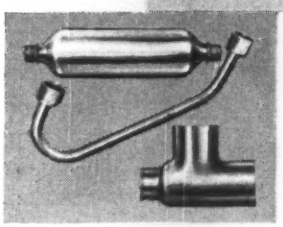

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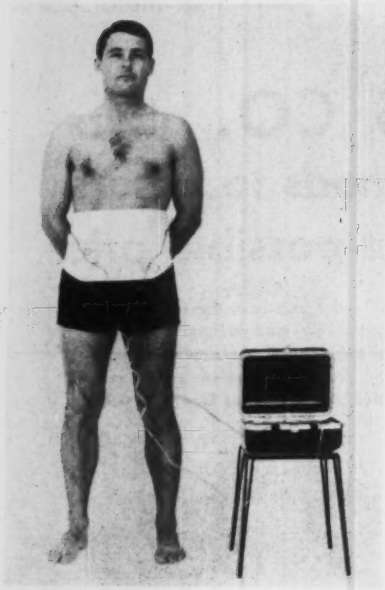

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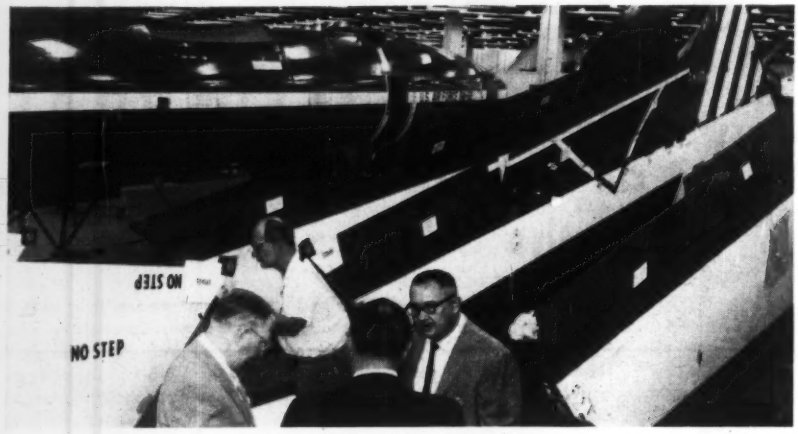


ON THE PLANT FLOOR: *Unit's PACE rating observer Joe Steibraker, D. N. Petersen, who directs the program, and Tom Blair, missile manufacturing assistant superintendent.*

done before the program was introduced—has a pretty fair idea of what is normal and what is abnormal in this respect.

What about creative work?

Nor is there any penalty for time spent in thinking unaccompanied by physical activity. Just what is going through a man's mind is, of course, impossible to detect, but creative and technical personnel are always given the benefit of the doubt. As Mr. Nolan phrased it:

> If a design engineer is staring at the wall but has work spread out in front of him, we must assume he is engaged in creative mental activity, though we have no way of knowing. On the other hand, if a typist is staring at the wall, she either lacks work or is not doing the work assigned to her. If such a situation is chronic, the idleness rate goes up, and the supervisor investigates.

Employees' failure to keep to the job in hand is not always their own fault, of course. There may be, as is possible in the case of the hypothetical typist above, a temporary lack of work. Or a factory supervisor might discover that an increase in out-of-area time had occurred because leadmen had taken people off the assigned work for engineering liaison or some other function that had been specifically delegated to another group. The aim is to flag the need for investigation.

The PACE index is plotted on a chart each week, with its components shown at the bottom. The score in the beginning is not considered too important; the critical thing is the trend. The objective is to bring the index into a "control area," or to 85 to 100 per cent of normal *optimum* effort, and to keep it there.

(Northrop reports that its investigations indicate that 55 to 65 per cent is common in the airframe industry. Some companies in other industries admit that on certain jobs they would be happy to get as much as 50 per cent.)

The rate of change is also watched closely. A "corridor" leading to the control area is shaded on the chart, and the group is expected to keep the PACE line within the corridor until it reaches the 85 to 100 per cent range. Since the effectiveness of office groups is not as precisely measurable as that of plant groups, it is evaluated by 15 point increments (70–85 per cent, 85–100 per cent, and so on). Point values required for plotting are determined by averaging.

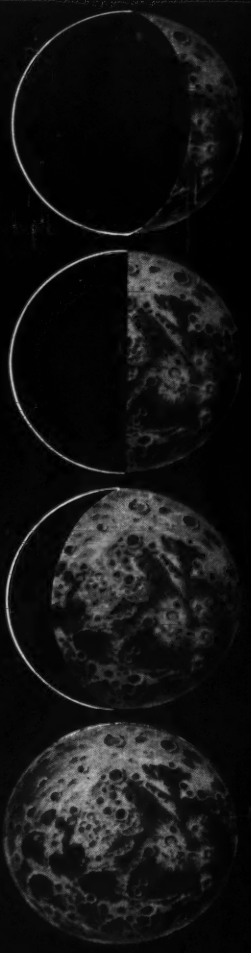
Charting production progress

Other charts incorporate, along with the PACE index, the changes in the personnel index and the budget realization index, and in the case of the accounting departments, a workload index. For production departments, the following three indexes are also used:

Schedule index—or the ratio of actual production to scheduled production. Being ahead of schedule is considered just as unsatisfactory as falling behind since it creates problems of its own (need for extra storage space, for example). If a department is ahead of schedule, the supervisor is expected to correct the difficulty by varying the number of personnel. (Study of the possibility of a schedule index for office departments is under way.)

Quality index—established from a formula developed by the quality control department. Far from causing mistakes, the stepped-up tempo induced by PACE, Northrop reports, seems to be accompanied by a rise in quality. If there is a point of diminishing returns, it has not yet begun to show up.

Shortage index—or ratio of parts shortages to the total number of parts



From first quarter to last:

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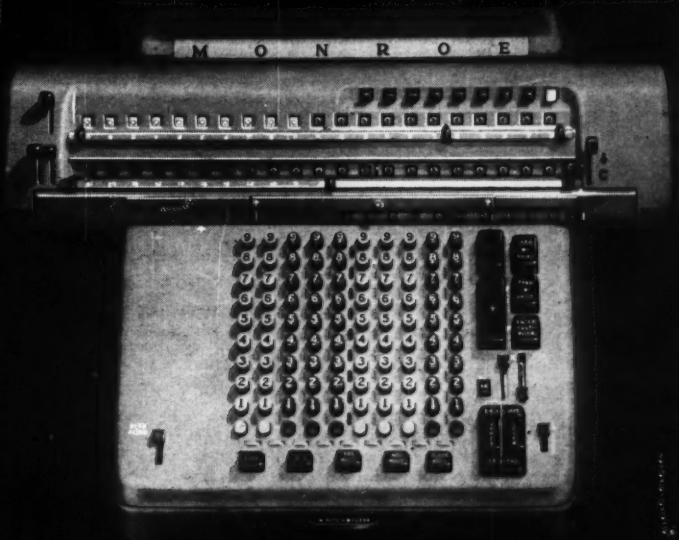

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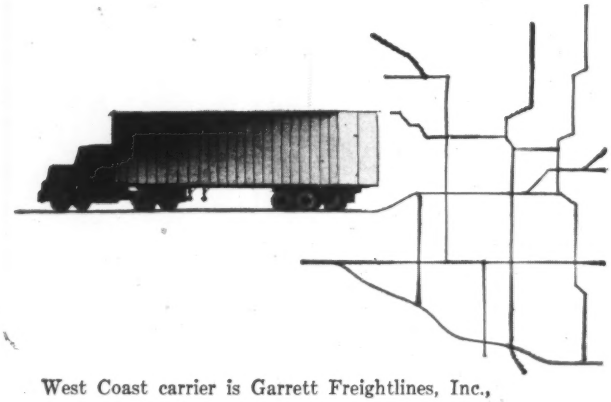

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that should be available. This is included because workers who are running out of parts tend to slow up in order not to leave themselves completely idle.

Supervisors of the PACE program carry out regular control observations for comparison with those of the regular observers. If an observer's report on a group differs substantially from that recorded by his supervisor, he is scheduled for additional training. And if his ratings continue out of line, he is replaced.

Any complaints?

Do the people observed resent the program? Do they fear that it may affect their status or pay unfavorably? Or that it may result in some form of "speed up"?

There have been no serious difficulties on this score, aside from a few small rumbles of discontent in the beginning. According to Mr. Petersen, who directs the program:

> As with most innovations, PACE encounters some resentment when it is first applied. Some people felt at first that they were being 'spied upon,' although their supervisors had already told them that PACE does not pinpoint individuals for criticism. However, as they become accustomed to the observer and had an opportunity to stop him on his rounds and ask him questions about his work, this resentment declined markedly. No conscientious worker resents a supervisor's doing his job. A supervisor's job is to make certain that his department maintains normal output. PACE is a tool to help him do this.
>
> As far as pay and status are concerned, PACE is explained to personnel as a means of improving Northrop's competitive position so that more jobs and greater opportunity will be available. We haven't encountered any complaints of 'speed up.' We have stressed that PACE is aimed at maintaining sustained *normal* effort.

Has tempo increased?

What of the results? Has work pace improved? Northrop is sure of it. During the first six months of the program, the division reports, PACE resulted in significant increases in productivity. The return on time and money invested, it adds, has been substantial.

PACE was started officially on a widespread basis last March and results have been so good that it is now being extended not only within the Norair division but to other divisions of Northrop Corp.

It is also arousing so much interest among other companies and in the U.S. Air Force that a PACE 'briefing team,' which explains the program in detail, is in constant demand by outside organizations.

—ALICE L. SMITH

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*Actual case history on file.

STRETCHED GLASS

continued from page 47

Glass-reinforced plastic kits are fast becoming one of the most favored tools of the plant maintenance crew. Corroded metal tanks and pipes are quickly put back into service with a resin-fiber paste, which adheres to wood, metal, concrete, and other rigid materials as it hardens. Du Pont claims these kits have saved them $250,000 in five years.

If a manufacturer wants to put fiber glass reinforced plastics either into or around his products, there are two paths open to him. One is to set up his own fabrication facility, a long-term investment. The more common method is to turn the job over to one of the 30 or 40 custom fabricators scattered about the country. Custom fabricators have the skill in die design to avoid warpage and unnecessary scrap losses. They take about three months from order to delivery in volume, says Harry L. Darby, vice president of Winner Manufacturing Company, Trenton, N. J.

It is also possible to buy reinforced plastic stock and machine it. But the glass fibers are pretty rough on cutting tools. Although tolerances are not so good as those for metals, the tolerances are adequate for many applications.

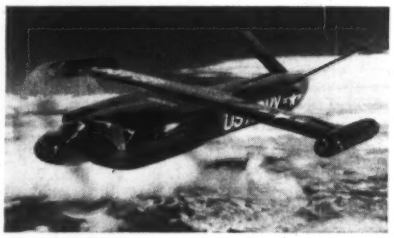
A number of different plastics, under the three main categories of polyesters, phenolics, and tough epoxies, can be selected to bind the fibers together. The proportion of plastic to fiber can also be varied to control flexibility. Various forming methods are available. Pigments can be added, but they sometimes affect fabrication procedures and strength. Reinforced plastics have a top service temperature of 500° F.

Glass fibers have gained a place as an important engineering material. They help strengthen the trend towards upgrading the materials-selection aspect of new product development. In today's hard-sell, cost-conscious economy, glass fibers are another important weapon in cutting production or maintenance costs or increasing the sales appeal of new products. —M. M.

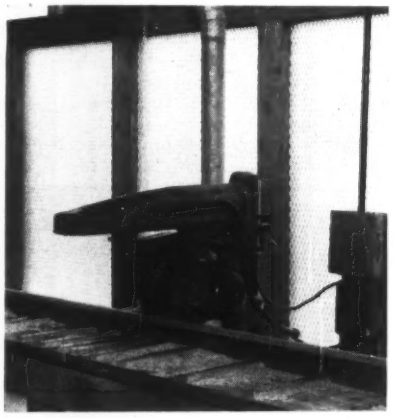
Glass Fiber's Competition

Glass fibers are not the only kind going into reinforced plastics, although they have preempted about 95 per cent of the market. The British have done a lot of work with long asbestos fibers for aircraft. The combination is not so strong as the glass fiber reinforcement, but it is more flexible. Reinforcement with sisal fiber gives a porous combination that grips tacks, also is good for making furniture or packaging. Other vegetable fibers used are cotton, jute, and hemp. For greater abrasion resistance, the synthetic fibers—nylon, dacron, orlon (with cotton)—are preferred. Orlon also has superior electrical insulation qualities.

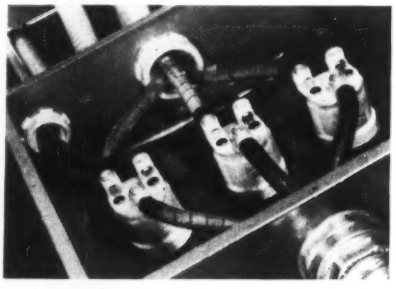
Although most of these other fibers are cheaper than glass, they are not nearly so strong.



AVIATION: *Reinforced glass fiber goes into many minor structural parts in planes, but the entire wing of this surveillance drone is made of the stuff. Built for the Army by Rheem Manufacturing Company, Downey, Calif., it is recoverable by parachute.*



STRUCTURES: *Reinforced fiber glass panels are widely used as roofing, siding, or partitions. For greater impact strength, metal mesh can be imbedded in the panel for rough usage, such as this woodworking shop. These panels are made by Resolite.*



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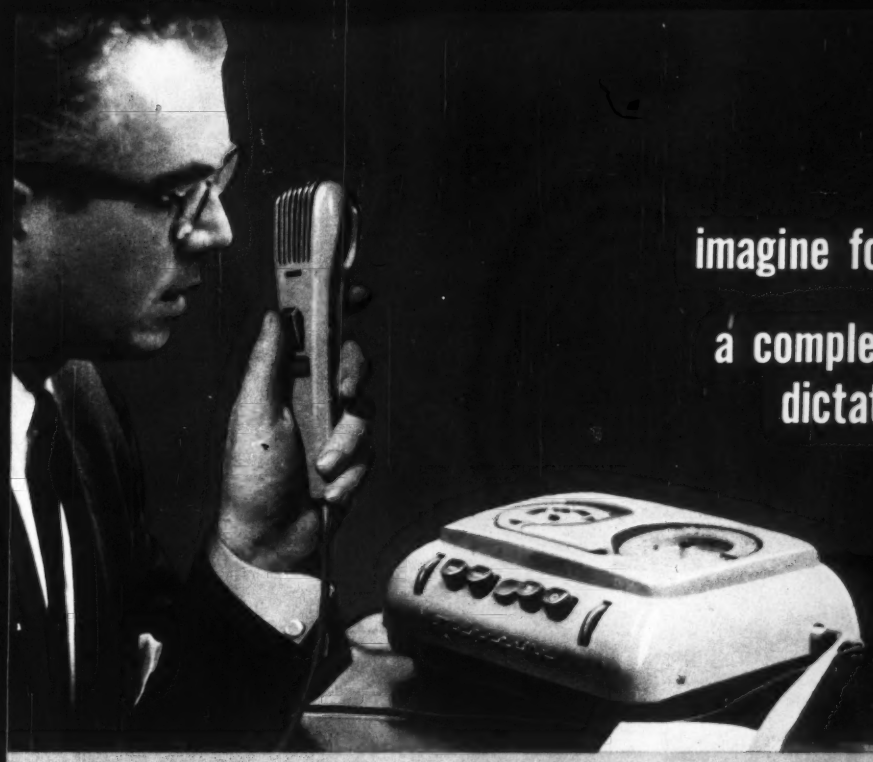

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REMOTE-CONTROL ERASER! Make changes without touching the machine. Relax in your chair, press the button on the "mike," listen to your last words—and *record the correct words right over the error*, thanks to safety control erasure.

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WORLD'S EASIEST TRANSCRIBING. Tens of thousands of secretaries operated their Stenorettes flawlessly *within five minutes after their first trial.* All agree that Stenorette's clear, restful "playback" permitted rapid, error-free transcription!

*A product of DuPont

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Imports Can Pay Off for You in '59

ALEXANDER O. STANLEY, *Contributing Editor*

Growing imports in the coming months may cause competitive headaches for a lot of companies, but there's another, more positive side to the picture.

INTERNATIONAL TRADE is in the headlines these days. The economic machinations of the Soviets in world markets, signs of a pick-up in our export trade, openings of more and more U.S. branch plants overseas, squabbles about expanding the European Common Market, new legislation to encourage U.S. business investments in underdeveloped world markets—these are among the bigger news stories on the financial pages. And when imports are involved, the headlines are seldom cheerful. It's easy enough to find a story about the damage to our textile industry or some variation on the chant of "Volkswagen go home!" but you have to dig to come across any reference to imports that has favorable and profitable overtones.

Yet imports are an important element in the structure of our economy. And this sector of our trade is well worth watching when you consider its positive aspect. For many U.S. companies, imports can help enlarge, not destroy, profit margins.

Potent economic leverage

Statistically, the dimensions of imports seem modest. But within the framework of our economy, they make a contribution far in excess of their apparent dollar size. The real measure of their importance is the degree of our dependence on imports to complete the fabrication of "Made in USA" products. Take a look at these figures:

At roughly $13 billion, imports are equivalent to about 3 per cent of our gross national product, or a little more than 6 per cent of the estimated value (at early stages of distribution) of movable goods produced in the United States. As a source of industrial raw materials, imports supply:

- one-sixth of our crude petroleum
- one-fourth of our iron ore
- one-third of our copper and rubber
- one-half of our raw wool
- the great bulk of our supplies of tin, nickel, aluminum (bauxite), and newsprint
- most of our supplies of various ferroalloying ores and metals needed to fabricate heat- and rust-resistant and specialty steels
- between 80 and 90 per cent of our requirements in manganese, chrome, antimony, and cobalt; and, to a lesser degree, in tungsten, lead, zinc, and cadmium
- a high proportion of our needs in industrial diamonds, mica, asbestos, and extra long staple cotton

Altogether, roughly 60 per cent, or $8 billion worth, of imported materials are in crude or semi-manufactured form. But this trickle into our pool of industrial raw materials contains potent ingredients.

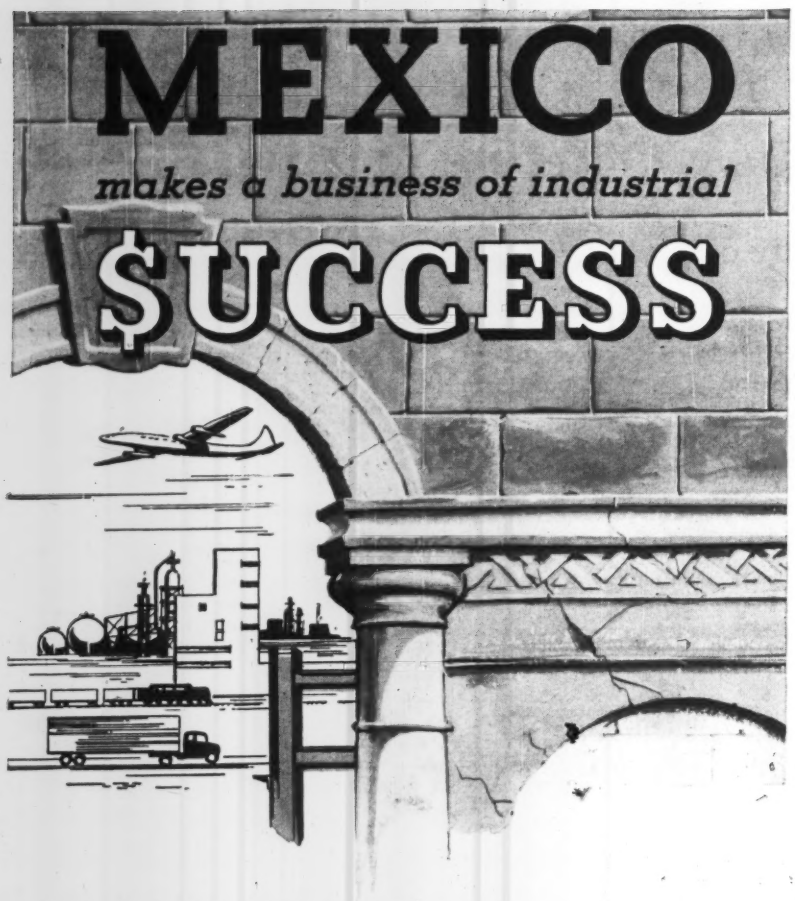
For example, foodstuffs, our second-ranking import in dollar volume ($3.2 billion), account for one in every four dollars we spend abroad. Half our imported food bill—$1.6 billion—goes out for coffee, cocoa, tea, and spices. Sugar and related products add another half billion dollars. For the most part, these products are only available overseas. Other food imports consist mainly of out-of-season produce such as Winter vegetables or specialty products, European cheeses, canned hams and other meat and fish products, wines, and spirits for the growing U.S. gourmet market.

Who feels the pinch?

Of course, the area of manufactured imports ($3.5 billion) is where competitive irritations flare up. What worries U.S. manufacturers is sometimes the trend, sometimes the immediate bite, these imported goods take out of domestic markets. Here are random illustrations of some of the more publicized problem-imports about which U.S. companies are grumbling:

Automobiles: *1957 (annual) imports, $307.8 million; 1958 (seven months) imports, $267.2 million. Increase in 1958: 70 per cent.* From sleek sports models in the $2,000-and-up brackets to pint-sized runabouts priced from $1,300 to $2,000, more and more foreign cars are

MADE IN ITALY: *Here, in the factory of Vittovia Necchi s.p.a. at Pavia, Italy, a group of Necchi sewing machines destined for export to the United States undergo sanding preparatory to final painting and inspection.*



For example, in the last 5 years, steel production has doubled. Chemical manufacture, non-existent 10 years ago, now represents a $240 million investment. In just 3 years, sulphur production has increased more than 10 times, sulphuric acid production has increased 125% and production of caustic soda, 183%. In the same period, output of railroad boxcars has risen from 16 to 1517 units.

These and other signposts of dynamic growth have set the stage for plans to spend $80 million for new highways in 1959—plus ambitious blueprints to improve railway, air and port facilities.

Mexico's remarkable industrial progress supports one of Latin America's most stable economies. It has been a major factor in producing an annual increase of more than 3% in per capita income between 1954 and 1957 despite a 3% annual rate of population increase—one of the world's highest.

Compañía Impulsora de Empresas Eléctricas, an investor-owned utility group, is anticipating the growing needs of its customers—expected to increase from 375,000 at the present to around 570,000 in '65—with a $40 million expansion program.

FOR YOUR COPY of an information-packed booklet on the opportunities for investment in Mexico, write General Manager, Compañía Impulsora, or Area Development Section, American & Foreign Power Company Inc., 100 Church St., New York 7.

Compañía Impulsora de Empresas Eléctricas, S.A.

Bolivar 21, Mexico 1, D.F.

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appearing on U.S. highways and byways. Odds are that the proposed hike in the Federal gasoline tax will spur interest in the small car this year. And this interest seems to be overflowing to imported trucks and buses. During the first seven months of 1958, imports in this group jumped more than 100 per cent to $10.7 million.

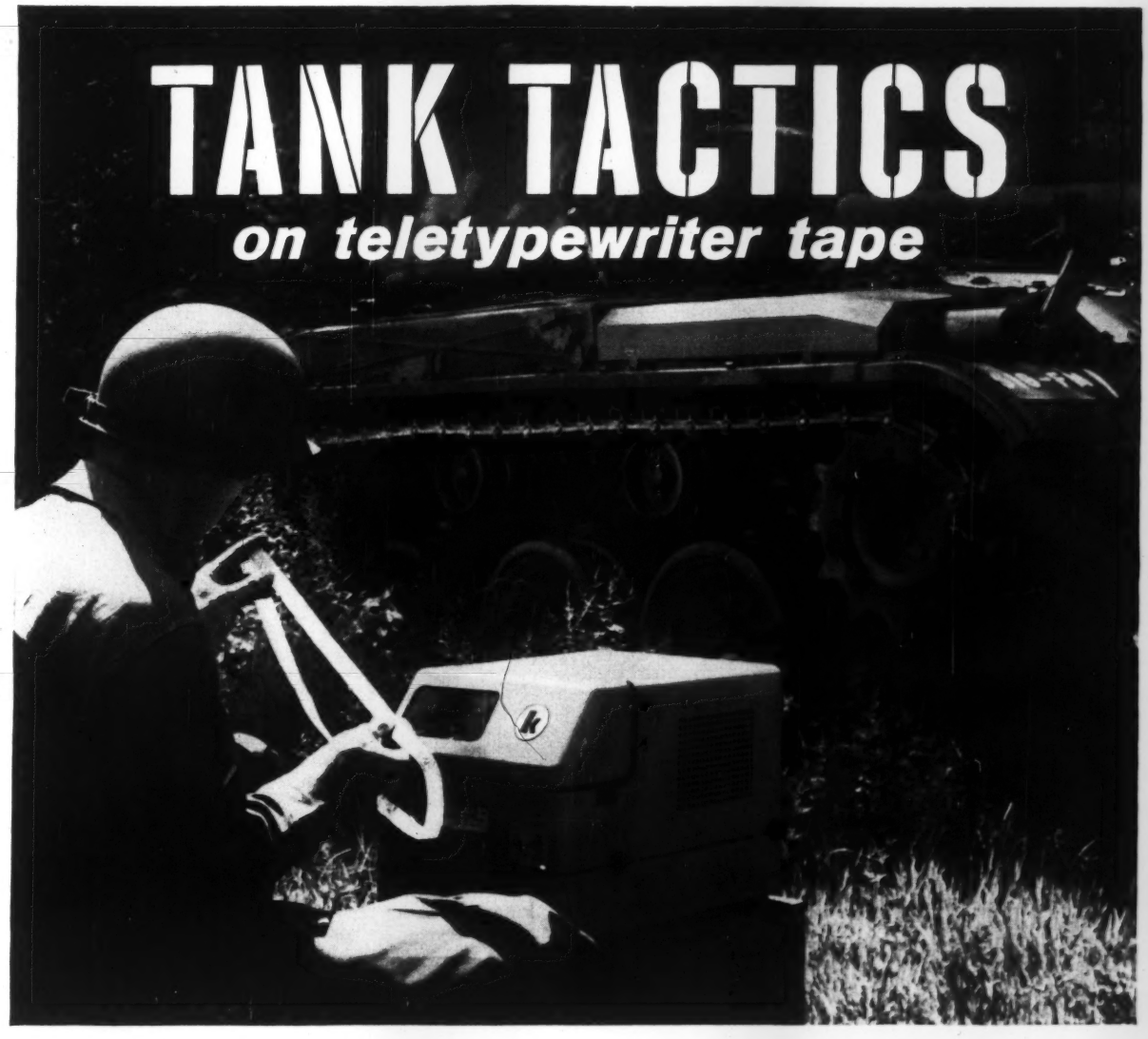
Electrical apparatus: *1957 annual imports, $143.2 million; 1958 (seven months) imports, $88.2 million. Increase in 1958: 10 per cent.* Imported radios, hi-fi sets and components, and a variety of consumer durables are appearing on the floors of discount and department stores. Sleek in design, well-constructed, and attractive in price, they are capturing consumer interest—and dollars. A hint of things to come: Japan's transistor radio exports to the United States, which in mid-1958 were averaging 50,000–70,000 monthly, are expected to hit 100,000 units before long. Minimum export prices on these sets range from $11.90 for receivers with four or fewer transistors to $15.10 for seven-transistor sets. The electrical appliance industry in Japan has shown an explosive growth since 1950, as the unit production figures shows:

Product	1950	1957
Washing machines	2,000	854,000
Electric fans	119,000	1,320,000
Refrigerators	5,000	231,000
Electric irons	253,000	2,021,000

While the market saturation of appliances is still low in Japan, this rapid growth in output suggests that some of these products may soon be knocking on U.S. dealers' doors.

Photographic goods: *1957 annual imports, $41.5 million; 1958 (seven months) imports, $21.6 million. Reduction in 1958: 2 per cent.* Movie cameras, box and fast lens and shutter cameras, frames, films, lenses, and special photographic equipment pour in from Japan, Germany, Austria, Sweden, Switzerland, France, and Canada. The retail price tags on these items are not always the major consideration, as camera fans will recognize. But not many months ago one prominent U.S. manufacturer of cameras discontinued one movie camera model because of price competition from an equivalent product being manufactured in Japan.

Industrial machinery: *1957 annual imports, $199.8 million; 1958 (seven months) imports, $105.0 million. Reduction in 1958: 14 per cent.* As a group, machine tools, especially gear-cutting, boring, drilling, milling, and metal-cutting machinery and lathes, predominate among these imports. And U.S. companies in this field are faced with a double problem. Not only are they dropping some U.S. customers to European competitors, but they are losing out in their exports to world markets. Primary



Capable of reception at speeds of 750 words a minute, new Kleinschmidt unit is world's fastest message printer and code puncher

A major breakthrough in mechanical printing! Developed in cooperation with the U.S. Army Signal Corps, this new super-speed teletypewriter is ten times faster than "standard" equipment, five times faster than normal conversation. In future commercial use it could speed operations such as the transmission of telegrams, stock market quotations, and weather reports. It has important applications in the field of integrated data processing. In recognition of its quality, Kleinschmidt equipment is manufactured for the U.S. Army under the Reduced Inspection Quality Assurance Plan.

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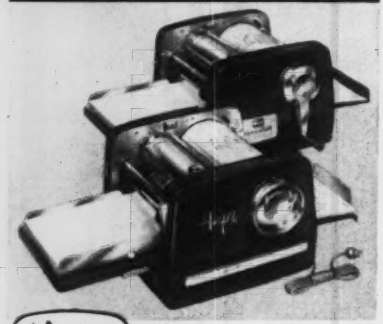

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3. **ADJUSTABLE FEED WHEELS**—grip paper at outer edges, give positive performance.
4. **FEED TENSION CONTROL**—assures non-skip feeding—thin papers to post cards.

Conqueror Duplicators also include such Heyer "firsts" as Copy Positioner Control which raises or lowers copy quickly and effortlessly . . . Visible Fluid Supply which conquers the problem of running dry . . . simple, positive Fluid and Pressure Controls . . . and the Automatic Start-Stop (on electric models) which shuts off the machine when the last sheet is printed. These and many more exciting features give you an outstanding combination found only in Conquerors, at *no increase in prices!*

Three fine models to fit your needs—two electric and one hand-operated. Sold and serviced by a nation-wide organization of selected dealers, and backed by Heyer's 56-year reputation for superior quality.

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complaint against European manufacturers: undercutting in prices.

Agricultural implements: *1957 annual imports, $80.5 million; 1958 (seven months) imports $82.0 million. Increase in 1958: 44 per cent.* Among plows and cultivators, tractors, headers, harvesters, disk and tooth harrows, milking machines, and a wide variety of other agricultural implements, foreign trade-marks —mainly Canadian, British, and German—are enjoying a growing demand here. And again we hear of stiff competition in overseas markets. The sharp rise of U.S. purchase abroad in this product area is well worth careful watching.

The textile, porcelain, and building materials industries, like certain elements of the food industry, have complaints of their own, as do most other industrial groups. In fact, no matter where you look, it's hard not to find some basis for worry about the import bugaboo.

Strategy for import profits

What are U.S. companies doing about the actual or implicit threats they see in imports? On the principle, "If you can't beat 'em, join 'em," some have ingeniously turned a competitive liability into a profitable asset.

- Chrysler Corp., the only one of the Big Three not producing a small car abroad, recently bought a 25 per cent interest in the French Simca. U. S. distribution through its dealer organization will help Chrysler get a share of the small car market this year.
- Some years ago, Majestic Radio Corporation saw the handwriting on the wall and arranged to market the German Grundig line of hi-fi and radio sets in the United States under a licensing agreement. Go to any popular store and you're likely to see the combination Grundig-Majestic sets on display.
- Stauffer Chemical Company several months ago created a joint venture in Germany with E. Merck A.G. of Darmstadt under the name of Stauffer Pharmaceutical, Inc. Purpose: to manufacture bulk quantities of several pharmaceuticals and fine chemicals in the E. Merck line for marketing in the U.S. and Canadian markets.
- On the other side of the coin, Marcel L. Bich & Cie. of Paris recently bought a controlling interest in the Waterman Pen Company, one of the oldest U.S. pen makers. Object: to develop and market a new and inexpensive line of ballpoint pens in the United States under a combined corporate name of Waterman-Bic Pen Company, Inc.
- In Argentina, American Cyanamid Company began operating an elaborate plant taking up 330,000 square yards of working space to produce antibiotics, serums, vaccines, vitamins, sulfa drugs, and food chemicals in quantity, not only to supply Argentinian requirements, but to export these products to world markets.
- Pantasote Company, manufacturers of vinyl film, signed an agreement a year ago with the Compagnia Italiana Nest-Pack S.P.A., licensing Pantasote to produce in the United States some new plastic packaging materials developed by the Italian firm. An interesting feature of the arrangement was that Pantasote was to use special machines built by the Compagnia Italiana at its Passaic, N.J., plant.
- Ex-Cell-O Corp., maker of precision machine tools and dairy equipment, recently added to its overseas organization of subsidiaries in England and Canada by acquiring the German machine tool concern, Werkzeugmaschinenfabrik Goppingen, G.M.B.H. This independent subsidiary, which produces lathes, medium-size planers, and textile looms, will add Ex-Cell-O products to its lines.

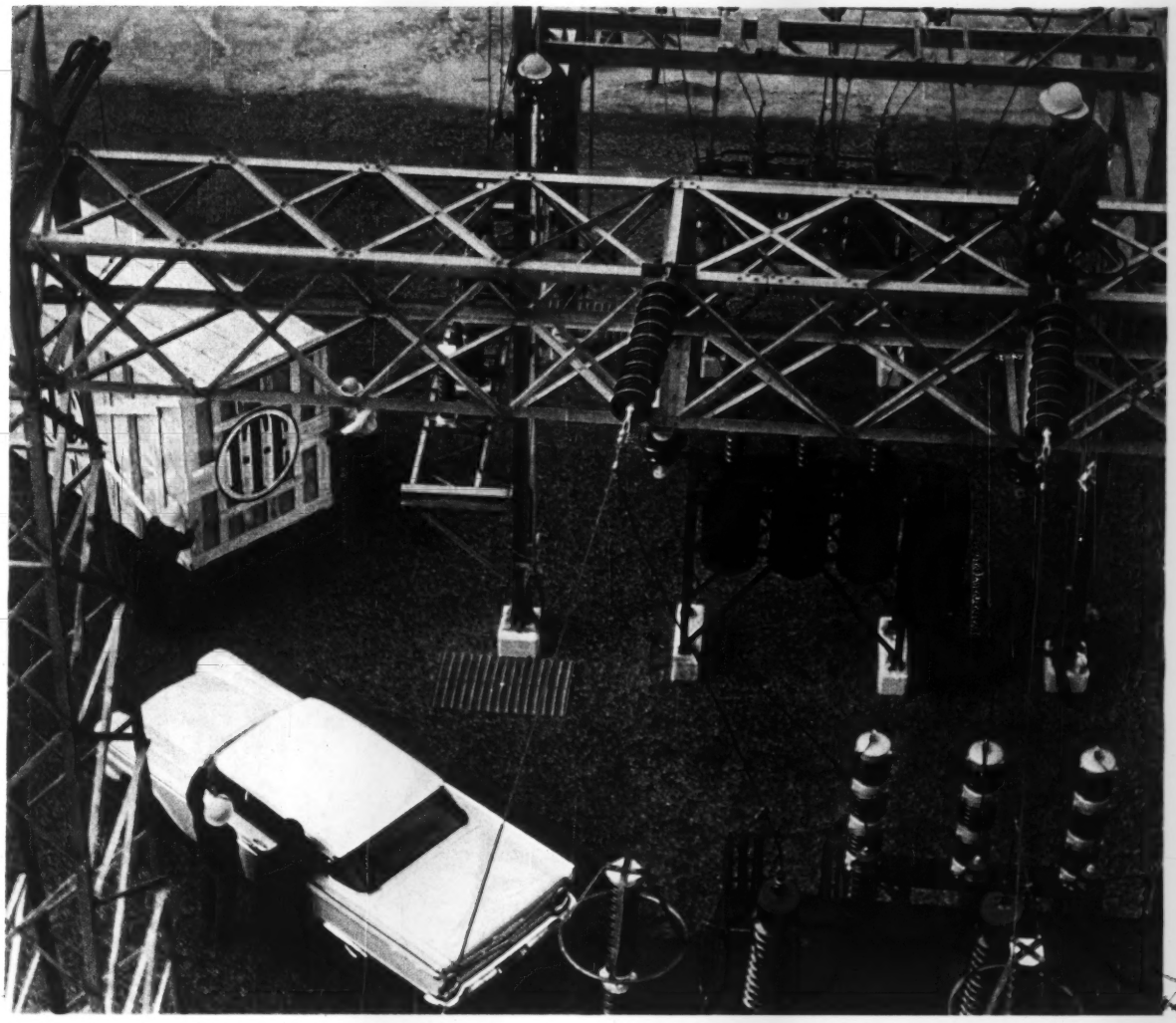
More on the way

With increasing frequency this type of news item appears in the daily press. The ubiquituous import is persistently showing up in our plants, offices, and homes. It's even appearing on our waterways. Not so long ago, the owner of a Hong Kong-built junk, Charles J. Schreiber, sailed his strange-looking craft into New York's East River and publicly announced that he was ready to import these 25-foot, two-ton, teak-hulled junks from a boatyard in Hong Kong. Suggested sales price: $4,500 f.o.b. New York. Without a doubt, the exotic import is here to stay!

If you're beginning to feel the pinch of imports or are convinced you should keep an eye on this important facet of world and domestic trade, here are two fruitful sources of data that will keep you informed of trends and trade opportunities:

- A monthly report, No. FT 110, is published by the Bureau of the Census, U.S. Department of Commerce, Foreign Trade Division, Washington, D.C. Here, hundreds of imported products are comprehensively listed by dollar volume. Also listed, month by month, are their principal foreign sources.
- *The Foreign Commerce Weekly*, published by the U.S. Department of Commerce regularly carries an "Import Opportunities" section listing scores of products and commodities offered by world producers. Also worth scanning is the "Investment Opportunities" section of this weekly. Here, in capsule form, are offers by concerns all over the world seeking to develop license or partnership agreements with their counterparts in the United States.

In any case, if you want to be safe, you'll do well to keep informed about imports. END



FIND THE MAN FROM PHILADELPHIA! This modern Penelec sub-station is 500 miles from his home office. He got here in less than 4 hours. He came by plane and he's standing beside the gleaming Avis Ford* he drove from the airport. There was no wasted time! The trip couldn't have been quicker . . . or more convenient for him!

It couldn't have been more efficient for his firm. I-T-E Circuit Breaker Company was one of the *first* to use the new Avis Corporate Travel Plan. New print-o-matic credit cards save red tape and paper work (no cash needed!). They assure easy accounting control of all car-rental charges.

Says the I-T-E Comptroller: "***We travel hundreds of men out of 12 different Divisions. Instead of a bale of rent-a-car bills and vouchers—each accounting office gets only ONE monthly invoice. It identifies and allocates each charge. The Avis Corporate Travel Plan is the greatest time- and money-saver that ever happened in the car-rental business!***"

Write for "20 Modern Ways to Solve the Problems of Business Travel." No obligation! Address AVIS, (Dept. 29) 18 Irvington St., Boston 16, Mass.

The new Corporate Travel Plan is another first from Avis

**Choose from all makes of fine cars —featuring 1959 Fords!*

Go places with **Avis**® RENT-a-CAR

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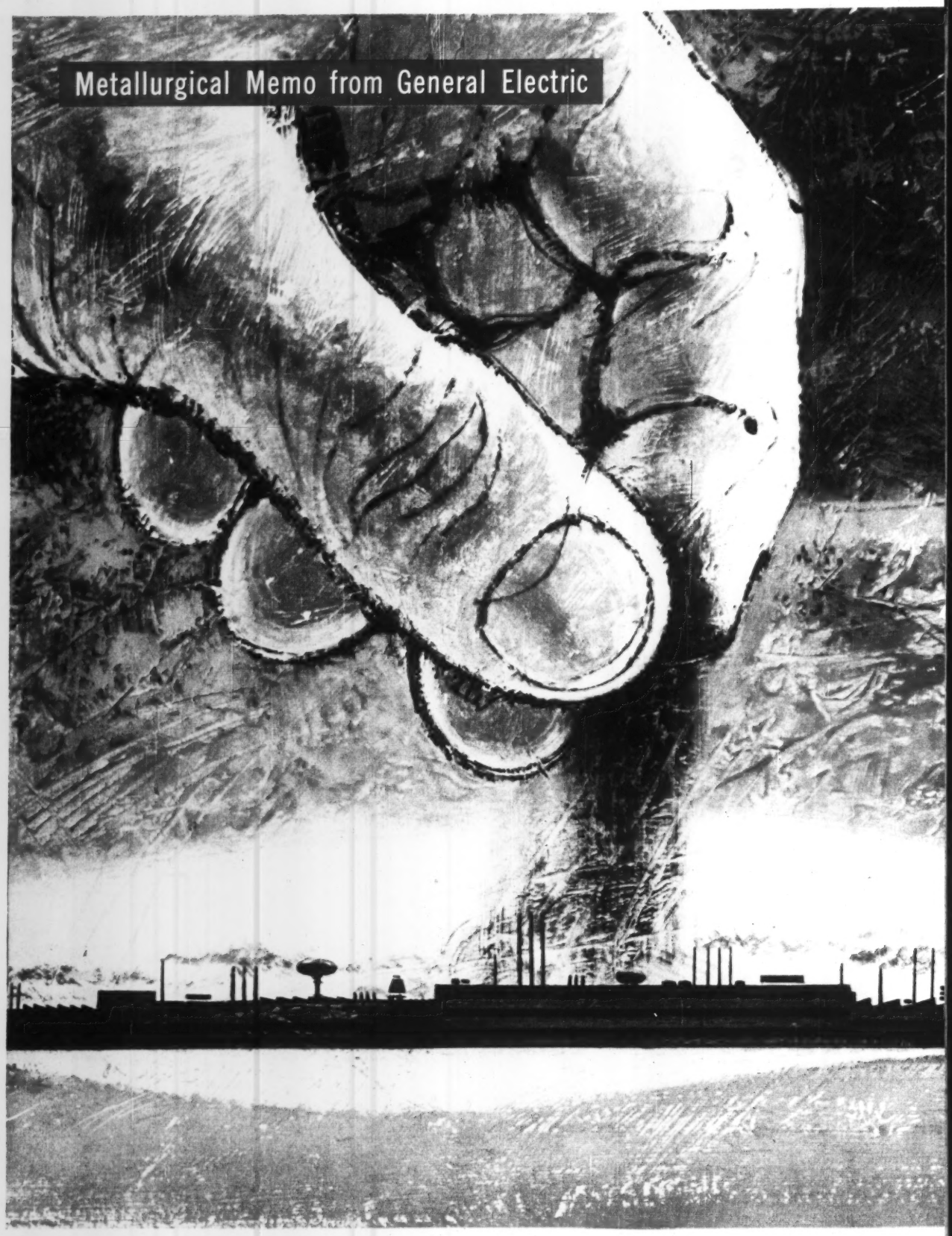
Metallurgical Memo from General Electric

How a pinch of powder cuts a billion-dollar waste

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Carbides are metal powders.

Cemented, they *create* man-made metals that wear up to 50 times longer than steel. Shaped into cutting-tool inserts, or molded into high-wear components, they provide one of the principal weapons in industry's attack on America's billion-dollar tool waste.

Basically, Carboloy cemented carbides replace materials which are inadequate for today's production—materials which work too slowly, break down too fast, need replacement too often. G-E engineers have developed carbides in many grades, with many varying properties to replace these materials . . . and to do jobs that weren't even possible before. They will help your engineers select the proper carbide to cut *your* waste.

Carboloy cemented carbides are one of the principal products of Metallurgical Products Department, headquarters for General Electric progress in metallurgy. Along with the other products listed below, they have one function: to help you make a better product—faster—at a profit! *Metallurgical Products Department of General Electric Company, 11179 E. 8 Mile Ave., Detroit 32, Michigan.*

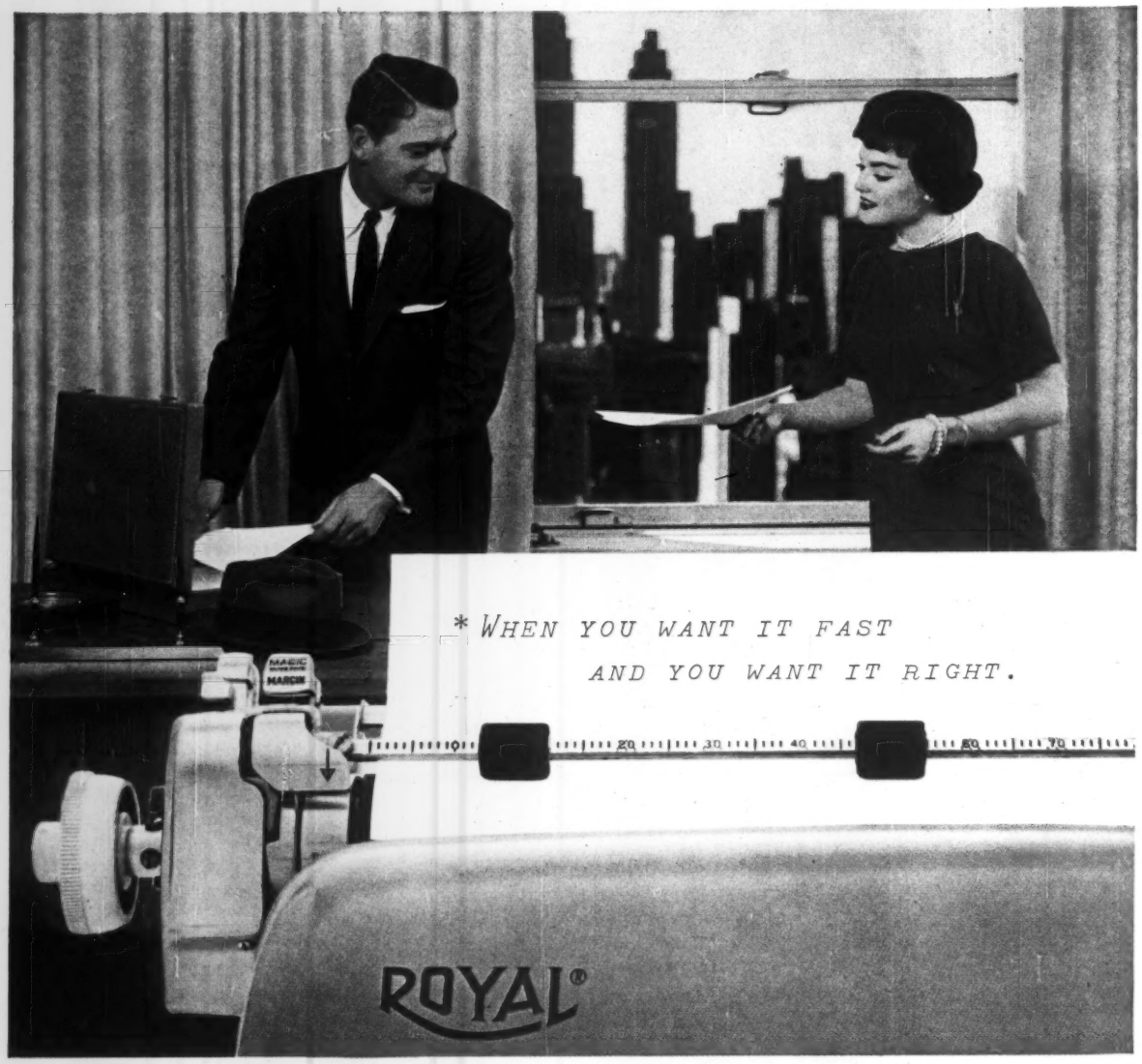
CARBOLOY®
CEMENTED CARBIDES

Miracle performance starts with quality, and consistent metallurgical quality is built into each batch of Carboloy cemented carbide by 29 separate control checks. Here, a Leco Carbon-Sulfur Determinator analyzes samples in Carboloy's ultra-modern $250,000 Quality Control Laboratory.

METALLURGICAL PRODUCTS DEPARTMENT

GENERAL ELECTRIC

CARBOLOY® CEMENTED CARBIDES • MAN-MADE DIAMONDS
MAGNETIC MATERIALS • THERMISTORS • THYRITE® • VACUUM-MELTED ALLOYS



UNEQUALLED SPEED! Scientific laboratory tests on automatic typing equipment prove the new Royal Electric is capable of an incredible 195 words per minute—or 15 characters per second!

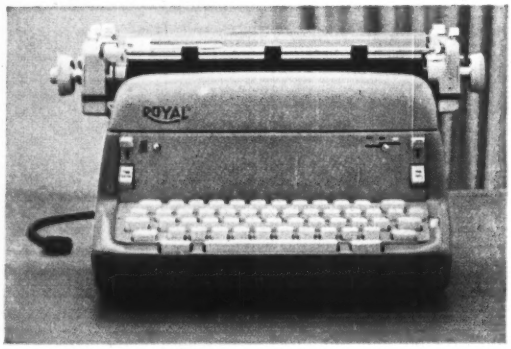
EASIEST TO OPERATE! Convenience features like exclusive Magic® Margin and Twin-Pak®, the instant changing ribbon fingers never touch—save time, cut typing fatigue to a minimum.

MATCHLESS REPRODUCTION! No heavy characters, no faint, fuzzy ones. You get the sharpest, most perfectly aligned work ever to come out of a typewriter!

WIDEST TYPE CHOICE! Choose from 74 exclusive, distinctive Royal type faces. There's one to fit your business needs perfectly.

Call your Royal Representative for a demonstration and free trial. Your old typewriters are worth plenty in trade.

* ROYAL EXECUTIVE, one of 74 Royal type styles.



There are more Royal Typewriters in office use than any other make.

the business-minded ROYAL® *electric*

Product of Royal McBee Corporation

TV Speeds Shipments on Their Way

COMPANIES that operate trucks—whether private shippers or common carriers—now realize it's better to make up time on the loading dock than on the road.

To get the best return on their investment in rolling stock and to speed shipments, companies must keep both moving as fast as possible.

One of the most unusual attempts at achieving these goals is being made at the Yale Transport Corp. terminal in New York, where for the first time closed-circuit television is being used as a substitute for direct management observation of a truck dock.

Ten cameras that operate 24 hours a day are spotted around the terminal dock, which handles several hundred trucks a day. They are linked to ten monitors in the terminal offices 250 feet away.

Additional cameras not yet installed will provide a view of the surrounding area beyond the loading platform and the actual truck bays. By scanning the yard and the streets approaching the terminal, the company hopes to avoid traffic jams and keep track of incoming vehicles. Terminals in other cities are also slated to get TV cameras.

The specific benefits of the new system should be of interest to the 14,000 private companies operating their own truck fleets of 25 or more units. Yale Transport reports the new system:

- Reduces the time a truck-trailer sits at the dock.
- Provides closer management control of loading and unloading operations, resulting in greater efficiency and safety.
- Protects goods in the loading area while company guards are off duty.

Since the director of terminal operations is able to see both the receiving and dispatching docks at the same time, he can relate the flow of incoming freight to the loading capacities of the outgoing areas. He sees quickly when a trailer is loaded, when an empty trailer is ready to come back in, and when more men are needed at one point and fewer at another.

Already several other trucking companies are looking into the economies provided by the electronic eyes.

Throughout industry TV cameras are busy at a wide variety of chores (see DR&MI, July 1956). In transportation, closed-circuit TV also is used to keep track of boxcars in marshalling yards.

—T.K.

BEFORE TV *was installed, truck spotting and dispatching were handled from this glassed-in section in the 43-bay loading area. A hindrance to traffic flow, it took up 500 square feet and obstructed the view of nearly half the bays.*

AFTER *the closed-circuit television cameras (see arrows, above) took over the chore of monitoring the busy bays, more shipments moved through the loading area, snarls were avoided, and truck-trailers spent less time in loading and unloading their cargo.*

THE DIRECTOR *of terminal operations, who has a picture of the entire terminal, can distribute the work load (via a public address system) among the 70 men on the floor and direct the handling of several hundred trucks a day in a single operation.*

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Industrial television (closed circuit TV), the newest means of visual communication, is now increasing profits and efficiency for industry, science and education. Undoubtedly, there is some area of your present operation (continuous process control, quality control inspection, data transmission, plant or property protection, monitoring gauge and instruments, safety, dispatching, etc.) that can be improved by the use of industrial TV. The question is—what area?... How will it be benefited? . . . and what is the cost?

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Many leading organizations now rely on Blonder-Tongue industrial TV systems. Included among them are U. S. Steel, Sharon Steel, Southwestern Portland Cement, Johnson & Johnson, E. I. Dupont, General Motors, Brunswick Pulp and Paper, Union Carbide, Douglas Aircraft, Public Service of New Jersey, Los Angeles Dept. of Water and Power, St. Mary's Hospital, Albert Einstein Medical Center, West Phoenix High School and many others.

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industrial TV systems • master TV systems • high fidelity components • TV products • FM-AM radios

A completely automatic Blonder-Tongue industrial TV system (compact, rugged camera; automatic light compensator; TV monitor) providing quality pictures can be installed for less than $2,500.00.

PLANNED OBSOLESCENCE

continued from page 41

being sold with the bald argument that "the old must make way for the new." The theoretical conditions necessary for the calculated use of materials failure to reinforce campaigns of style obsolescence are present in the industry.

Nevertheless, it seems unlikely that the automobile companies are, in fact, using such an approach. The brand names of automobiles are probably better known than the brand names of any other product, and a proved accusation of shoddiness could be competitively catastrophic. Again, while very few women would wish to be seen in any but the latest fashions, a large section of the community still desires a durable automobile, and is quite willing to drive something old. (The existence of an active used-car market still is vital to the selling of new automobiles.) If social philosophers find the contemporary American automobile less durable than might be ideally desirable, the blame is less likely to lie in the shoddiness concomitant with style obsolescence than in the difficulties of maintaining high standards of quality control when the labor force is strongly unionized.

Functional obsolescence and style obsolescence are also very closely related. Even in the area of quickly-consumed goods—drugs and toiletries, for example—modern marketing procedure calls for a change in style whenever there is a change in function to heighten awareness of the "new" product. Again, a style change will be far more effective in creating obsolescence if an improvement in function can be associated with it. Thus Chrysler advertised the "aerodynamic" values of fins, and electric stove manufacturers found reasons why wall ovens do a better job of roasting turkeys. In the advertising of consumer durables, the most important single task is to convince those who already own such goods that the new styles are functional, not just decorative.

Chance takes a hand

Not everything that happens in the world is necessarily "planned." Artificial obsolescence is clearly in the self-interest of the durable goods manufacturer, and its occurrence in the marketplace is plainly visible. The fact that things happen as an intelligent manufacturer would wish them to happen argues strongly that there is an *intent* toward obsolescence. But intentions and plans are greatly different breeds of cat.

Continuing reactions to continuing changes in market conditions could create patterns of "planned obsolescence" with no more long-term planning than that performed by, say, a football coach. It is always hard to determine whether or not a given business achievement

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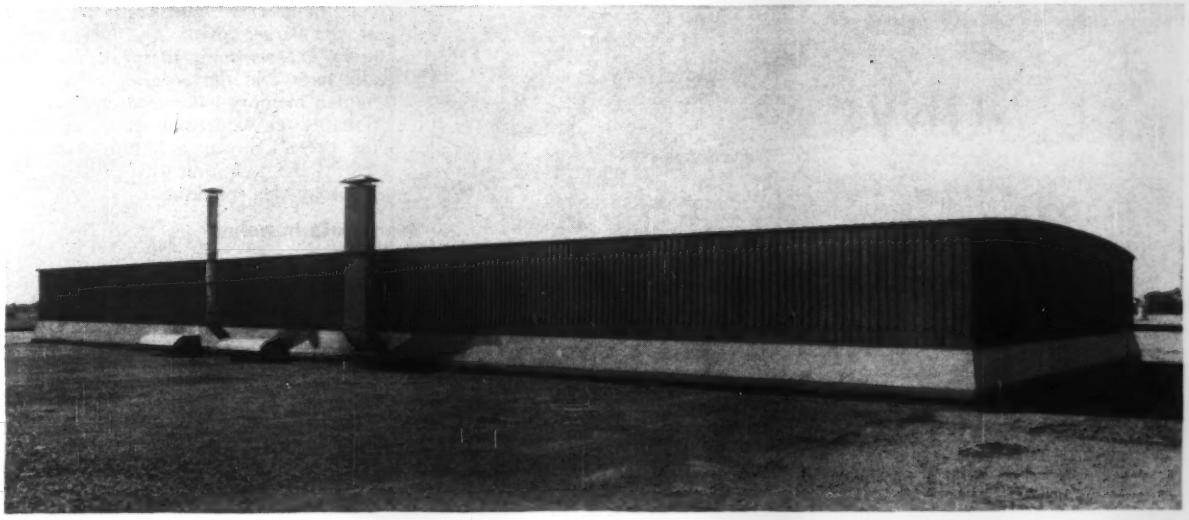

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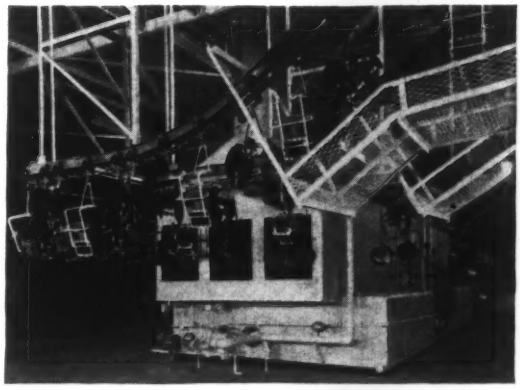

Mahon Three Conveyor Line Two-Stage Metal Parts Cleaning Machine—Another Unit of the Compressor Processing Equipment Installed at Copeland Refrigeration Corporation, Sidney, Ohio.

The High Temperature, Low Dew Point Dehydrating Oven illustrated above is part of the modern straight-line production facilities for processing Compressors in the Copeland Refrigeration Corporation's plant, Sidney, Ohio.

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was really *planned* to happen as it did. A great deal of on-the-spot decision-making is involved even in a thoroughly planned operation, and only someone who has lived with the situation can say for sure how greatly these small decisions made under the impact of market conditions have influenced the course of the larger plan. And when these lucky experts come to speak, one usually finds that the notoriously selective human memory has interpreted past actions by the value of present results. If the operation was a failure, luck was bad; if the operation was a success, the planning was splendid.

A case in point

One of the clearest examples of intended obsolescence in recent years was the introduction of the "stereo" phonograph record and associated playing equipment. The change from conventional records and phonographs was functional. Though a considerable technological change was involved, no alteration in the appearance of either record or playing equipment was required. The new technique involved an undoubted potential for improving accuracy in the recording and the reproduction of sound, and it could honestly be maintained that stereo made existing equipment "obsolete."

Economically, some considerable functional advance was much to be desired by the manufacturers of phonographs. Despite the popularity of "high fidelity," the rate of increase in the market had slowed, and by the Winter of 1957–58, the pipelines from factory to consumer were well clogged with slow-moving items. Stereo offered manufacturers the chance to build a new replacement market and also to force rapid, sale-price disposal of stock-in-being on distributors and retailers.

The first successful demonstrations of stereo records and playing equipment were performed in the Fall of 1957 by Decca Records (Britain) in London and by the Westrex Corporation in New York. Almost immediately, the larger manufacturers proclaimed their intention to proceed as quickly as possible with the manufacture of stereo goods. The fact that the techniques had been developed by relatively small companies (Westrex was a subsidiary of Western Electric, but AT&T had agreed to divest itself of the subsidiary as partial answer to an antitrust problem) meant that secrecy was out of the question. Manufacturers, in this case, didn't want secrecy anyway, because part of their aim was to use the threat of obsolescence to push existing goods through the channels at increased speeds.

An initial delay developed because the two systems, British and American, were different in several details. Two meetings of the engineering staffs of

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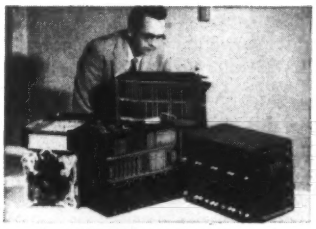
RAMO-WOOLDRIDGE

While it is now a division of **Thompson Ramo Wooldridge Inc.** instead of a separate corporation, **Ramo-Wooldridge** remains an integrated organization for research, development, and manufacture of electronic systems for military and commercial applications. R-W's military work is covered by thirty-four contracts with the Army, Navy, Air Force, and other government and industrial organizations. These support a broad technical and—in some cases—manufacturing program in such varied fields as Electronic Reconnaissance and Countermeasures; Microwave Techniques; Infrared; Analog and Digital Computers; Air Navigation and Traffic Control; Antisubmarine Warfare; Electronic Language Translation; and advanced Radio and Wireline Communication.

In the commercial field, the well-known RW-300 industrial process control computer and associated equipment—the basis of the expanding business that **The Thompson-Ramo-Wooldridge Products Company** is doing with process industries—was developed and is manufactured by the Ramo-Wooldridge division.

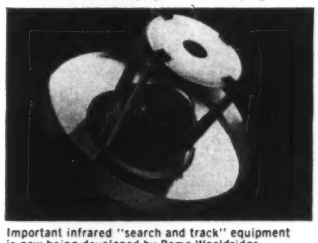
Men, machines, and manufacturing know-how from other TRW divisions will be added as needed to build up the growing production strength of the Ramo-Wooldridge division. In other ways, too, the availability of the special skills and facilities of the rest of the corporate family will broaden the services R-W can offer to its customers. However, R-W's major systems work will continue to be done in an organizational framework that brings the engineering and manufacturing groups into close-knit project teams in the division's own integrated development and manufacturing facilities in both Los Angeles and Denver.

Ramo-Wooldridge is production-oriented in the sense that its end objective is the manufacture and sale of equipment. However, because of the highly technical nature of its product lines, the R-W division will continue to give unusual emphasis to maintaining a high degree of professional scientific and engineering competence.



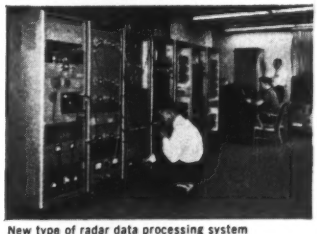
The completely transistorized RW-30 airborne digital computer has a volume of 4.19 cu. ft. and weighs only 203 lbs., including power supply

Ramo-Wooldridge is responsible for advanced electronic sub-systems development for application with both current and projected missile programs

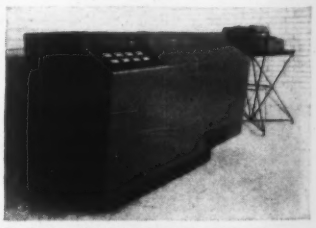


Important infrared "search and track" equipment is now being developed by Ramo-Wooldridge for applications in modern U.S. Military aircraft

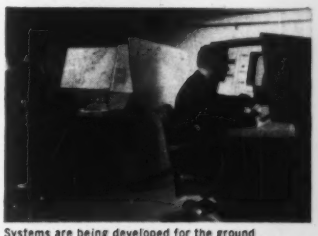
R-W is one of the major participants working with the Boeing Airplane Co. Systems Management Office on the U.S. Air Force Dyna-Soar project



New type of radar data processing system developed by R-W materially increases the capabilities of ground defense radar

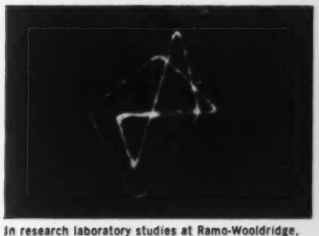


The RW-300 digital control computer has broad applications in automatic process control, data reduction and test facility operation



Systems are being developed for the ground processing and interpretation of photographic and other data collected by aerial reconnaissance devices

The Military and Ramo-Wooldridge are studying the use of automatic data processing techniques



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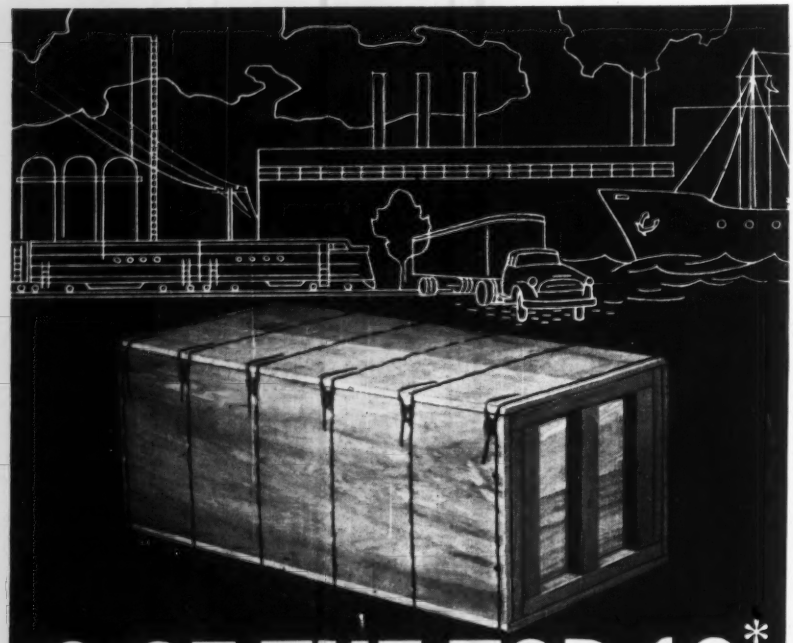

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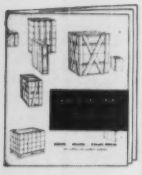

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all the potentially important producers of stereo phonograph records were held in January and February of last year. (The meetings were not publicized because of a well-founded fear that the Justice Department might take an interest.) Significantly, the meetings failed to produce general agreement on the best technical approach to stereo. Nevertheless, the largest single company in the market—RCA Victor—decided to go ahead with the Westrex system as refined by its own engineers. All the other companies shortly fell into step behind the leader in the approved fashion, and marketing departments prepared to introduce stereo to the public in the Fall.

Many a slip

No engineering department in the industry was really happy with the decision to market stereo in the Fall of 1958—although, as the head of the largest such group said, "We'll get through it all right. We've learned to invent on schedule." Marketing departments, however, were convinced that delay increased the danger of the competition coming in first and slicing off an unduly large share-of-market. This fear was well-founded. Even before the policy decisions had been made in executive offices, one of the smaller record companies had come out with a line of stereo records (though the equipment on which they could be played did not yet exist, even in prototype). In the early Spring of 1958, one of the larger phonograph manufacturers held a press showing of its new stereo line and even advertised to the public that its stereo equipment was now on sale in the stores. If any appreciable demand had been stirred up by this announcement, the company would have had explanations to make to both its dealers and the public because the production lines were not yet in operation. But the gamble paid off. The company managed to tie its name to the new development without arousing the ire of disgruntled prospective purchasers.

All off schedule

In the end, nobody met delivery dates. RCA Victor engineers refused to release their designs for production on the deadline day. Westinghouse stylists were still unable to decide on cabinetry as late as mid-June, although introduction was scheduled for a trade fair in July. General Electric, which had manufactured the largest-selling quality "pickup" for conventional high fidelity installations, did not even begin production on its stereo pickups until the last week in September. As the result of the rush to meet release deadlines, the first stereo phonographs on the market were not—to put it mildly—of the quality expected from their emi-

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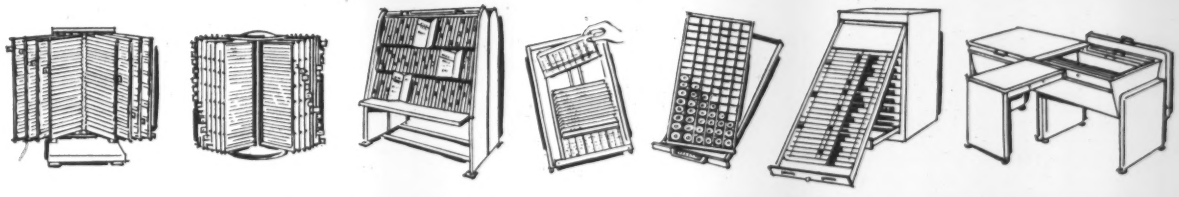

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nent manufacturers. Moreover, phonograph dealers, noting that the stereo items were not coming through on schedule, refused to be hustled into store-wide inventory sales, so that the anticipated clean-up of older models was not achieved.

Time will not only heal these wounds; it will turn them into battle ribbons. In two or three years, when stereo is solidly established, authorities will look back on the frenzied days in Spring and Summer 1958, and cite the introduction of stereo records and phonographs as an example of "planned obsolescence." And fair enough, too, for the obsolescence of conventional phonographs was certainly the industry's *intention*. But nobody who sat up with the patient through the feverish pre-introduction nights—as I did—could ever honestly say that the obsolescence was *planned*.

Planning vs. flexibility

One of the oddest features of the current business thinking is the prestige which the word "plan" has achieved among men who are most vocal in their loyalty to the concept of a free market economy. It was only a few years ago that Peter Drucker assured the nation that deep recessions were no longer possible because the essential cause of serious economic setbacks was a decline in business investment, and that long-range planning had now made such declines inconceivable. Nevertheless, the recession of 1957–58 was characterized by a very severe slash in business investment in reaction to prior overproduction of capital goods. (Partly due, by the way, to an unsuccessful pattern of artificial obsolescence in the capital goods market, especially in equipment for the manufacture of steel, nonferrous metals, and automobiles.) Planning, which is unresponsive to the market conditions, would be indistinguishable from the socialist administration of business. But Mr. Drucker thought such planning was a good thing, a sign of the maturity of our business leaders and the excellence of our present semi-competitive business structure.

The genius of capitalism is, in point of fact, its ability to react swiftly to market changes, and to the extent that any "planning" tends to lengthen that reaction time, it places the company involved at a severe competitive disadvantage. Notwithstanding the virtues of long-range planning as taught in business schools and reported at management conferences, it is unlikely that corporate policy-makers will carry the concept of long-range planning to the point of renouncing all flexibility of corporate action and reaction. Rigid long-range planning would be an especially severe handicap if it were applied to withhold innovation until some later time. The more one studies the question of "planned obsolescence," the more certain it seems that the phenomenon occurs because business men react to changing conditions, rather than because they plan.

Competitive free-for-all

The introduction of stereo illustrates some of the problems involved. Even technical discussion on an industry-wide basis was regarded as risky under the antitrust laws, and any large-scale agreement on marketing procedures would surely have called down the wrath of the Federals. Without a better espionage system than most businesses are willing to support, therefore, no company can be entirely sure how its competitors are proceeding with any innovation. The safest course is to rush ahead, full speed, and get your own version on the market as quickly as possible. Even where an entire industry starts with everybody at scratch—with a public announcement of a new process available to all by license, as the Westrex announcement of its stereo devices—each company scrambles forward at full tilt. The scramble gets even more frenzied when an individual company's research department comes up with something new and has no way of knowing for sure whether the competition has hit upon the same idea.

THE AUTHOR • Martin Mayer, author of the recent bestseller, *Madison Avenue, U.S.A.* (Harper & Brothers), has been a business news reporter and editor of several trade and consumer publications since receiving a degree in economic theory from Harvard in 1947. He is the author of a novel and an earlier nonfiction book, *Wall Street: Men and Money*, both published by Harpers. He is a regular contributor to *Esquire* magazine and has written for *Harper's Magazine*, *The Reporter*, *High Fidelity*, and numerous other publications.

Haste can be risky

"Planning," if the word means anything at all, implies that something is held back for the future. In a competitive consumer market, holding back can be profitable only if the item in question is not yet perfected—or, to put the matter more precisely, if it cannot be made to function properly when produced in large quantities. (RCA Victor gained nothing whatever by being first on the market with a gremlin-ridden color television set.) Otherwise, the overriding marketing necessity is to be *early*. Each year, as technical advances are made, companies vie with each other to be the first to get their new products before the public. Such a process is the essence of competition, but it prohibits meaningful planning.

Style obsolescence is more subject to planning than functional obsolescence—partly because it is less dependent on the accidental timing of technical innovation, partly because the discontinuance of a style tends to frighten the market (as Chrysler found out in the 1930's), and may even lead prospective purchasers to cherish rather than to disdain what they already own. Even here, however, the trick is to arrive at the preferred style ahead of the opposition, and the market researchers must work with the stylists to determine how quickly appearances can be altered.

The disastrous 1958-model automobiles led critics to wonder whether obsolescence, as a marketing device, had not finally lost its place in the American economy. Such a development, while not inconceivable, would be revolutionary and thus surprising. The feeling that last year's furniture is now "obsolete" has deep roots in the American past, in the psychology of mobility, the love for the frontier, the belief in progress. If ten years of depression did not interfere with the American notion that the new is better than the old, it seems unlikely that a one-year recession, however deep, can wield such influence.

The case against obsolescence

Regarded critically, patterns of obsolescence show many unfortunate facets. The discarding of "perfectly good" used wearing apparel and machinery is a well-known sin-and-shame. Nobody likes waste. Constant stress on the importance of newness diminishes respect for craftsmanship. It would be sad to think, as *Time* magazine does, that Americans are now buying cheap rather than good wrist watches because they wish to have something they can discard painlessly when fashions change. (One could also argue that high-priced watches have simply been losing ground to other big-ticket items in a period when consumers have had to think twice about major expenditures.) And within industry itself the need to get there first with anything new may produce diminished quality and some strikingly odd product features—like the first refrigerator cold controls, which were not connected to anything.

Nevertheless, the market wants newness, and producers must react to the market. Perhaps there would be less uproar over "planned obsolescence," from both conservative and radical social critics, if business men stopped stressing the very minimal amount of true planning that can, in reality, be applied to the problem of enlarging replacement markets. END

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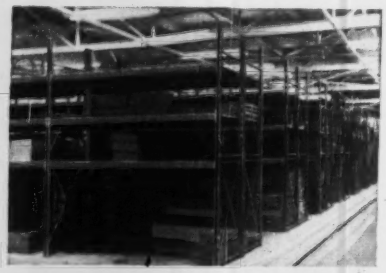

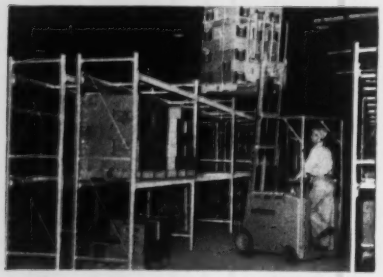

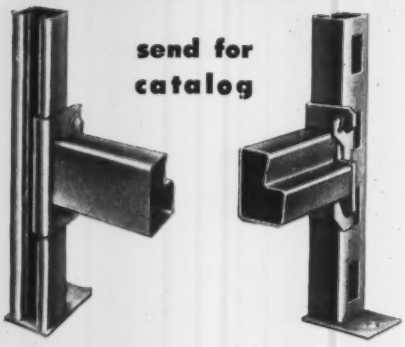

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Grooming for Leadership

APPRAISING EXECUTIVE PERFORMANCE *by Carl Heyel. American Management Association, Inc., 1515 Broadway, New York 36, 189 pages, $4.50.*

The best techniques for judging a subordinate's executive skills and attitudes and motivating his self-improvement through the planned appraisal interview are demonstrated by practical example.

Spurring Worker Output

THE SCANLON PLAN *by Frederick G. Lesieur. The Technology Press and John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, 169 pages, $4.50.*

A collection of articles by industrial relations experts and operating executives, evaluating and explaining an unusual program for encouraging worker participation in production planning through incentive bonuses.

Executives in Action

THE DECISION MAKERS: CASE HISTORIES OF SUCCESSFUL MANAGEMENT *by R. R. Conarroe. The Bureau of Business Practice, 100 Garfield Ave., New London, Conn., 180 pages, $10.*

Fifteen top executives, in candid profiles and interviews, reveal the management practices and concepts they have applied to meet business challenges and solve day-to-day problems—and the qualities of leadership which have carried them to the top.

Spotting Better Workers

BEHAVIOR OF INDUSTRIAL WORK GROUPS: PREDICTION AND CONTROL *by Leonard R. Sayles. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, 182 pages, $4.75.*

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MANAGING YOUR INVENTORIES

continued from page 49

In addition, some other significant trends in management have aggravated the problem. One is the tendency to fill executive positions with "specialists" who have depth but not breadth of experience, and who are therefore more likely than ever to take a narrow, departmental view of inventory matters. Under conventional accounting systems, executive merit rating programs may also tend to produce the same results, for the simple reason that inventory costs, being charged to the company as a whole, usually do not enter into evalution of individual job performance. Likewise, value analysis programs in purchasing may have a similar effect when their sole aim is to minimize purchasing costs without consideration of the inventory costs of maintaining an undue variety of materials and components in stock.

A matter of mathematics

Sound inventory management can only be achieved by integrating the various factors which contribute to obtaining the most profitable turnover. This involves the use of some square root formulas and, in a few cases, more advanced mathematics. For many years, business executives who prided themselves on being practical men scorned such techniques as "too theoretical." Furthermore, office machines were not available to perform the required calculations, and executives believed the mathematical techniques were too complicated to be handled by clerks.

However, the introduction of electronic office equipment has resulted in an entirely new approach. In a recent survey (see DR&MI, September 1958), a group of 165 top executives cited inventory control as the paperwork area in which they expect to make the most progress through automation and mechanization during the next five years.

The value of the operations research method also has been recognized. Mechanized procedures that integrate order writing, invoicing, sales analysis, production control, and inventory records are now common. Under such systems, it is practical and economical to employ the most advanced techniques of scientific inventory management.

However, smaller companies, whose volume does not justify such high-priced equipment, can adopt the same scientific inventory practices by installing simple manual or semi-mechanical systems, utilizing graphs, charts, tables, or slide rules.

A good inventory management program contains the following features:

- Inventory policies are formulated by a top executive who has adequate ex-

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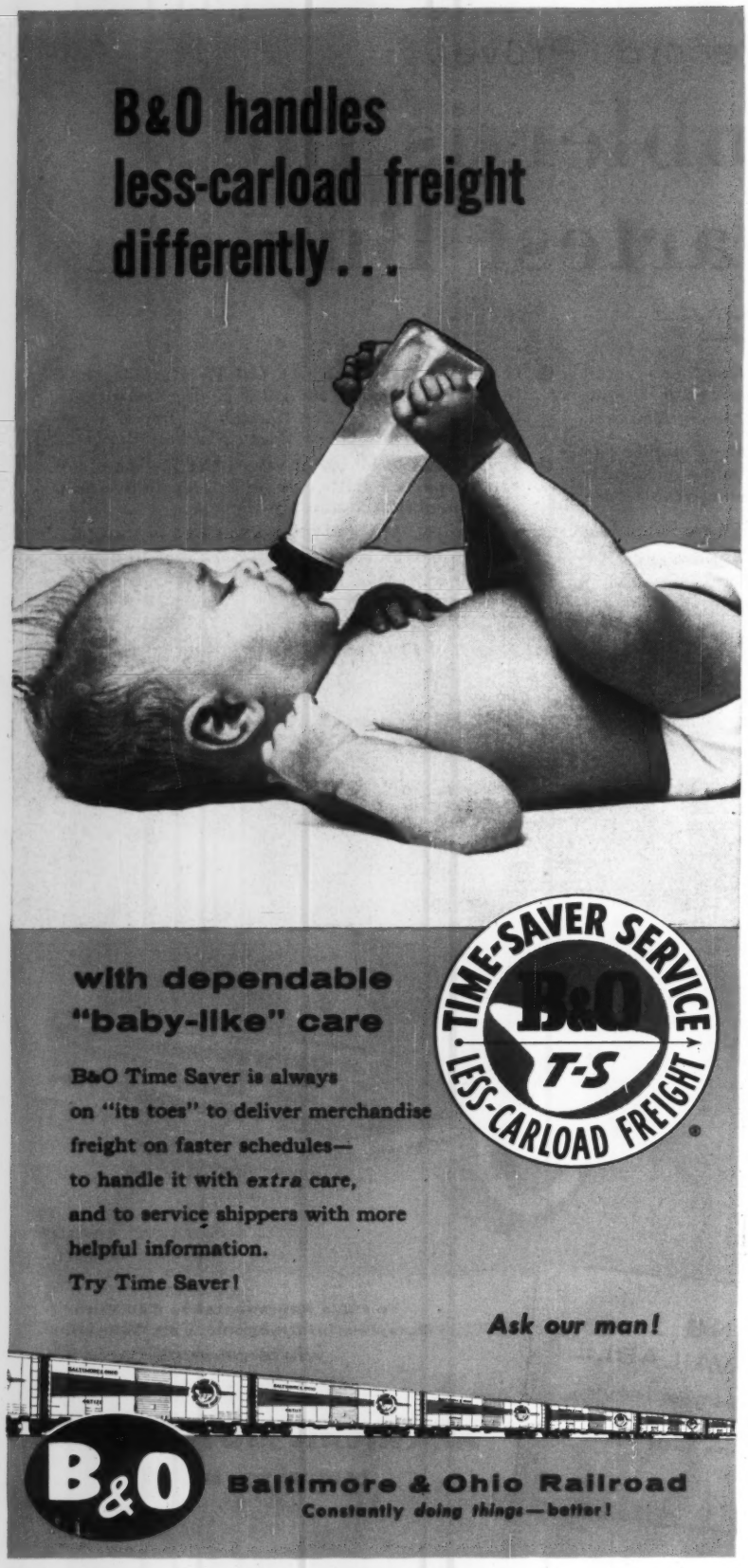

perience to evaluate all the factors necessary to determine the most profitable inventory practices. He also enforces adherence to these policies by departments whose operations are affected by inventory decisions.

- These policies are set down in writing. They are in sufficient detail to permit operating personnel in various departments to make prompt inventory decisions requiring a minimum of higher approval. They include specific instructions relative to revising order points, determining the size of production and procurement lots, arriving at make-or-buy decisions, determining what items are to be stocked at different points, including inventory carrying charges in selling prices, and selecting methods of shipment.
- Since inventory management requires an operations research approach, these policies incorporate formulas. Such formulas may be introduced directly into computers, or converted into charts or tables, making possible nearly automatic decision making.
- The policy requires that sales, manufacturing, and procurement obtain the same approval to exceed inventory levels as for other capital expenditures. In too many companies, management has found, a junior executive, who would have to get board approval for capital outlays above a certain amount, is allowed to expend several times more on increases to inventory, with no more justification than that he *feels* it is the right thing to do.

All department heads concerned are permitted to participate in the development of these policies. They evaluate the effect different policies will have on their operations. For example, the sales manager evaluates losses resulting from out-of-stock situations, and the plant manager determines the effect different inventory levels will have on production schedules. These factors and others are considered in forming final policies.

Choosing the policymaker

The reasons behind the adoption of the final policies which may place restrictions on their activities are explained to department heads. This is important, because ideal inventory management cuts across many department lines. Unless the program is clearly understood by all, it may well contribute to poor morale and poor teamwork.

The proper placing of responsibility for the over-all program is the most important step in establishing an inventory management program. The man chosen should have the authority and stature to see that the program is carried out. In retail and wholesale organizations, where the controller usually processes these qualifications, sound inventory programs are the rule rather than the exception.

However, in manufacturing concerns it is more difficult to place this responsibility. In the first place, the manufacturer's inventory problem is different from the distributor's. Though inventories represent a lesser investment, relatively speaking, they constitute a tougher problem, including as they do raw materials and work in process as well as finished goods. In addition, the organization structures of manufacturing companies are more complex, with greater decentralization of authority.

Unfortunately, in many manufacturing organizations the controller or treasurer lacks the authority or background necessary to spearhead an inventory program. Unless the controller has broad responsibilities which include absolute authority to place restrictive controls on sales and manufacturing operations, it is wise to locate the responsibility for inventory management elsewhere.

A top-level function

Placing the responsibility with a sales or a manufacturing executive may be dangerous, as individuals in these positions may be inclined to carry large inventories to achieve better customer service or longer production runs. If the company does not have a "strong" controller, treasurer, or vice president for finance, the task of making inventory policy may properly be assigned to an executive vice president, a vice president for planning, or a vice president for administration.

In smaller companies, which have no such job titles, it may be necessary to place the responsibility with the president or a staff assistant reporting to him. Since inventory management involves the analysis of detailed facts, it does not lend itself to committee-type action. Committee decisions are too apt to be influenced by personalities and general philosophies rather than cold analysis of factual data.

Few know carrying costs

Knowledge of the cost of maintaining inventories is the keystone of scientific inventory management, which entails comparisons of inventory maintenance costs with the effect of various stock levels on the sales effort and on manufacturing and distribution costs. Within a company, these carrying costs may range between 10 per cent and 40 per cent of the inventory value per year.

Few companies keep good records of their inventory carrying costs. Many accounting systems, in accordance with traditional principles established before World War I, relate most or all costs to direct labor. Such treatment may result in misapportionment of distribution and inventory carrying charges. Over the years, the relative importance of direct labor as the yardstick of total cost has

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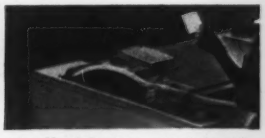

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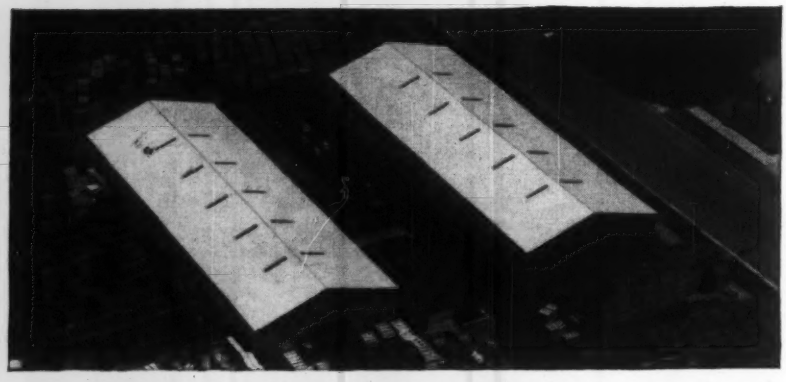

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been diminished by the greater relative expenditures in other areas (e.g. new facilities and equipment, distribution, research and development, manufacturing controls, and clerical personnel to maintain records required by operating departments and governmental agencies).

Inventory carrying costs include the following elements: (1) cost of capital invested in inventories; (2) markdowns due to obsolescence; (3) insurance charges; (4) local taxes on inventories; (5) cost of warehouse space; (6) clerical costs for stock record maintenance and the taking of physical inventories.

Under the typical accounting system, these costs may be included as indirect manufacturing costs, distribution and selling expense, or administrative expense. Write-offs for obsolescence, which can be the biggest single element of carrying costs, often are charged directly to profit and loss accounts and are not included in costs. With this confused accounting treatment, it is easy to understand why inventory carrying charges are hard to determine, and why sales and manufacturing executives lack the incentive to take a real interest in inventory problems.

THE AUTHOR • Robert H. Hinck, who is in charge of the Inventory Management Division of Wallace Clark & Company, Inc., New York management consulting firm, became associated with Wallace Clark in 1947, has a background of experience in manufacturing as a top production executive, and has successfully handled a variety of assignments in systems and procedures work and financial management.

Confusion hid carrying costs

Here is how the accounting aspect of inventory management was applied profitably by a manufacturer of replacement parts. This company had a better-than-average inventory policy. It knew its over-all carrying charges and had good records of the manufacturing set-up and unit costs. This information was used to establish economic production lots for replacement stocks. Quite properly, this led to a situation where an average two months' inventory was maintained on 20 per cent of the items which were most active, and an eight months' inventory on the least active items.

However, the over-all inventory carrying charges of 21 per cent a year, or 1.75 per cent a month, were spread equally over all sales. Detailed analysis revealed these charges were 1.5 per cent a month on the active items and 2.25 per cent on the slow items. This difference was accounted for by greater obsolescence on slow items and the fact that a

greater portion of the slow items was stored in outlying locations where warehousing costs were higher. As a result, the cost of carrying fast items actually amounted to only 3 per cent of their total cost, but equalled 18 per cent of the total cost of slow items. The analysis revealed slow-moving items were losing money, while fast-moving items were more profitable than reported. The situation was corrected at the next price increase. Most increases were applied to slow-moving items, and good competitive prices were kept on active lead items.

Diversification slows turnover

Another company broadened its regular product line and, at the same time, entered into a program of diversification which added many slow-moving items to the line. Inventories now turned over only once in every seven months, as compared with a former turnover of once in every three months. According to accounting records, profits on the original product line, before taxes, dropped under competitive pressure from 12 per cent to 5 per cent. Analysis revealed the reduction in profits was fictitious. Actually, the line proved more profitable than ever when inventory carrying charges were applied to individual product lines rather than to all products. This led to a reappraisal of pricing policies on items added to the line.

These two examples show how inadequate accounting treatment of inventory carrying charges can lead to a spiralling situation which progressively lowers profit margins. Under such conditions, profitable high-turnover items may be erroneously over-priced.

Fresh facts for better scheduling

Improved communications represent the one single step which will lead to improved inventory turnovers in the typical company. Providing production departments with prompt information on sales trends will allow prompt modifications in production schedules. This, in turn, will keep stock in better balance and permit equal or better customer service with less inventory.

An example of this is seen in the experience of a manufacturer of a stock line of light machinery. He kept no perpetual inventory records, but instead took a monthly physical count of stocks. A monthly stock position list was sent to a central office where it was analyzed. Eventually decisions were made on the quantities to be manufactured. The actual directive to produce reached manufacturing five to nine weeks after significant sales trends appeared. The inventory was a confused picture of many out-of-stock items and a great many more over-stocked items. Relations between manufacturing and sales were badly strained.

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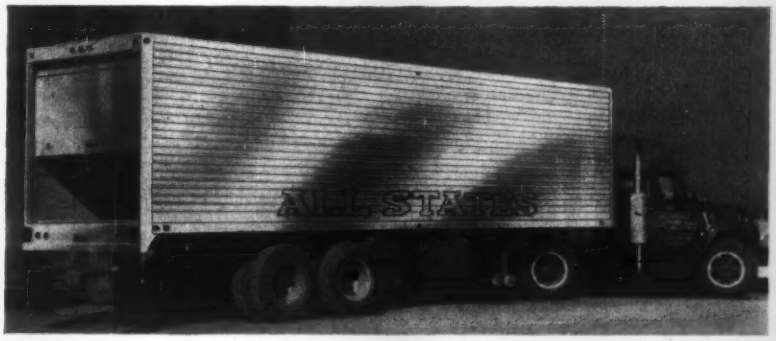
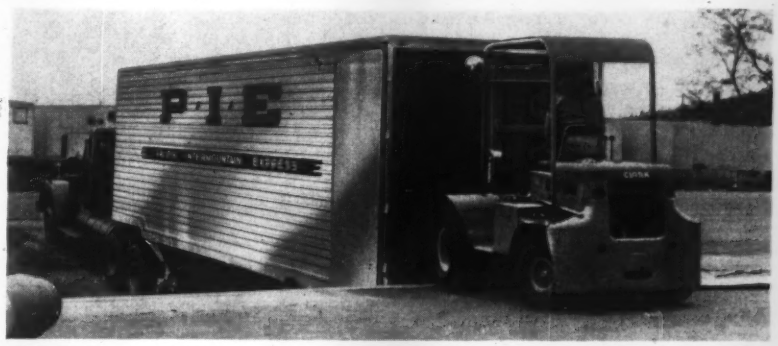


Price Saving: Mass-produced custom models—Standard Brown trailers can be modified to meet specific customer requirements. A fleet recently delivered to an eastern operator had overhead rear doors because customer felt they were less susceptible to damage than hinged doors.



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To overcome this situation, a daily posted stock record was installed. Manufacturing became aware of significant changes in sales trends within a few days and was able to "roll with the punch," and inventories were balanced. The result was fewer back-orders and better customer service, with 30 per cent less inventory. In addition, within the next year, sales increased by 25 per cent. This was substantially more than the most optimistic forecasts. All agreed that the only explanation for this unlooked-for increase was the improved customer service resulting from better inventory management.

In this installation, the stock records were kept on punched cards which could be integrated economically with existing mechanized sales analyses and invoicing routines. The use of punched-card equipment permitted the use of certain sophisticated techniques, such as continuing revisions in order points and order quantities on the basis of forecasts and computed sales trends.

Understanding "safety stocks"

The explanation of how inventories can be substantially reduced by improved communications requires an understanding of the principles of "safety stocks."

Most successful stock record programs include the use of "order points." Replenishment orders are issued when the stock level hits the "order point." The "order point" is based on a "lead time quantity" and a "safety stock." The lead time quantity represents the average normal demand for goods during the time it takes to communicate the need, manufacture it, and ship it. The safety stock represents the probable above-average demand, caused by sales fluctuations, that will occur during the lead time period. The larger the safety stock, the less the chance of being out of stock. However, in determining the size of safety stocks, the loss occurring from out-of-stock situations should be shrewdly calculated.

Long lead times weaken the dependability of forecasts, making it necessary to carry larger safety stocks to insure against greater volume deviation from normal sales. Since safety stocks are, in effect, dead inventory, it is obvious that any steps taken to reduce the communication time, the manufacturing time, or the delivery time to the warehouse will bring about reductions in inventories.

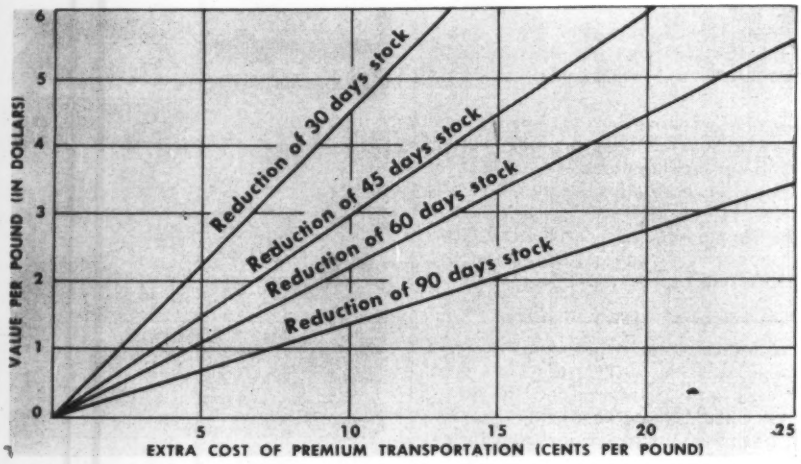
The principles behind safety stocks have been discussed in various technical journals during the past few years, but only a few companies have put them into practice. The proper size of safety stocks can be determined by the same statistical laws of probability, known and used by card players and crapshooters the world over. While safety stocks should increase with lead times, this increase should be in logarithmic, not arithmetic proportion. In general, safety stocks should be related to the square root of the increase in lead time.

The two most commonly used methods of computing safety stocks do not employ these principles. This leads to unbalanced inventories. Some companies compute safety stocks as a percentage of the lead time quantity. This causes inventories to be higher than necessary on long lead time items, and inadequate on short lead time items. In other companies, which base safety stocks on a fixed number of weeks supply, regardless of lead time, just the opposite will occur.

Two other factors which should be considered in determining the size of safety stocks are the volume of individual items and the average unit of sales. Statistical principles also apply in these instances. For example, a high-volume item requires a lower relative safety stock than a low-volume item. Here again, there is a logarithmic proportion. These calculations are simple fare for the electronic calculator. But they may also be applied manually using simple charts and tables.

The effect of these principles is illustrated by the experience of the manufacturer who decided to change his distribution policies. Instead of shipping from the one warehouse located at his plant, ten regional warehouses were established to give better service and take advantage of bulk shipping rates. No over-all increases in inventories were planned for it was intended to maintain the same inventory turnover rates. The laws of probability soon caught up with this decentralized operation. The branch warehouse safety stocks proved inadequate to handle the more volatile sales fluctuations which occur at lower volume levels. A reappraisal of the situation indicated that it was necessary to increase over-all inventories by 75 per cent to maintain adequate customer service. In some cases, branch warehouses had to be enlarger to carry the additional stocks required.

When Faster Shipping Pays Off

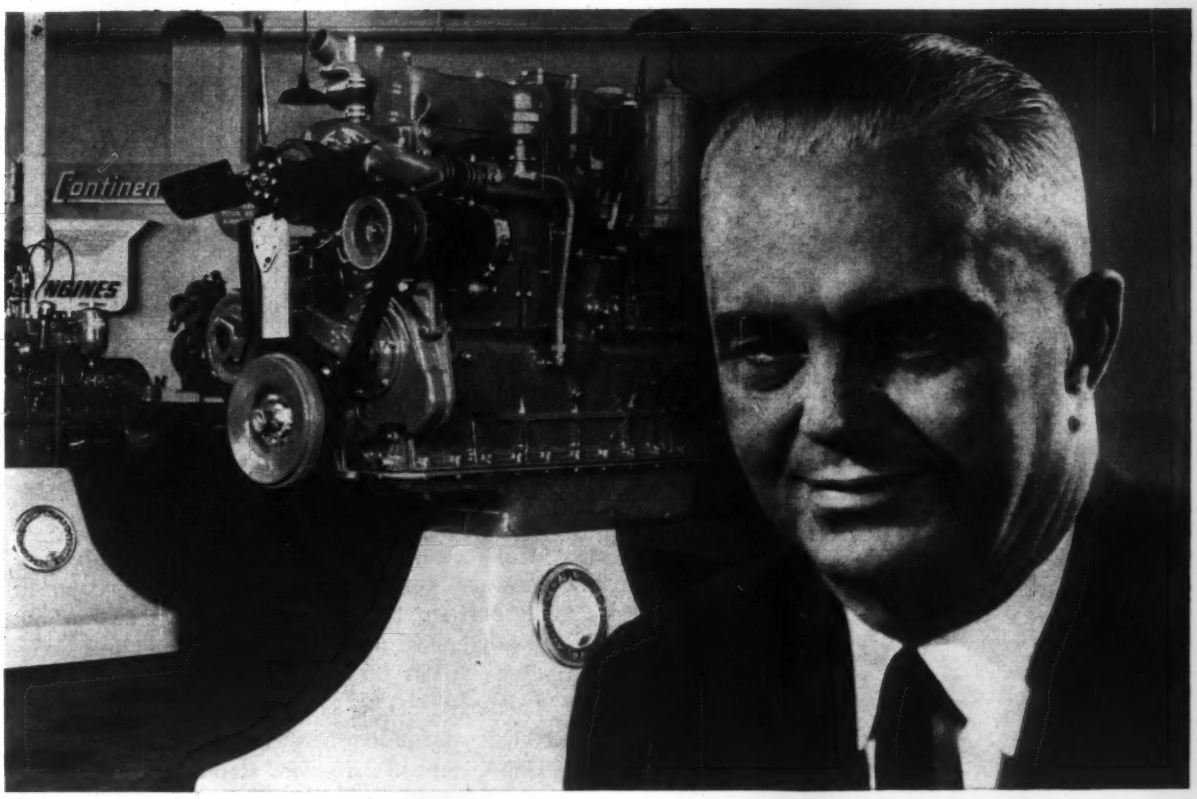


THE CHART ABOVE, *which assumes inventory carrying charges of 25 per cent of value (the approximate national average), shows break-even points for inventory reductions of 30, 45, 60, and 90 days resulting from the use of premium transportation. If point corresponding to value per pound of item and extra cost of premium transportation falls to left of break-even line, the faster shipping method will save money.*

Faster shipping for economy

The problem of large branch warehouse inventories may be overcome by use of premium types of transportation. Faster or more frequent shipments will reduce these inventories (see chart). In some cases the use of more costly LCL, LTL, or air shipments makes it possible to eliminate branch stocks completely. Whether or not premium transportation is economical depends on the amount of inventory carrying charges that will be saved by its use. In general, those items which cost more than $1 per pound or have a turnover of less than twice a year are candidates for premium transportation.

A good inventory management program is a positive approach to increased profits. It is a unique program because more profits can actually be obtained with less, rather than more, capital investment. In addition, it has no features which will necessitate bargaining sessions with labor. In fact, a good inventory program will be welcomed and supported by the unions. Adherence to the principles of inventory management results in a leveling out of production, thereby avoiding the disturbing effects of layoffs. END



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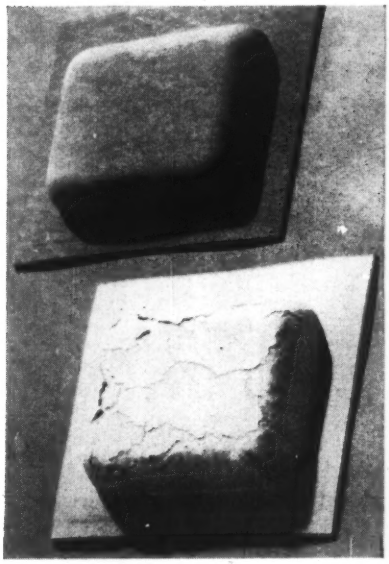
BAD MANAGEMENT of research and development is more the rule than the exception in U.S. industry today, judging from the findings of a new survey conducted among 100 major companies by the well-known consulting firm of Booz, Allen & Hamilton, New York. Their conclusion: There's no dearth of opportunities to improve the effectiveness and efficiency of vital R&D in industry. In most of the companies studied, up to half the R&D personnel were not sure of company objectives. In only 23 per cent of the companies was there any formal method of evaluation of research —one reason, perhaps, for the fact that, on the average, two-thirds of R&D projects are classed as failures.

Another reason for poor results may be the frequent preoccupation of R&D labs with nonresearch assignments such as trouble-shooting and technical service. Although Booz, Allen & Hamilton recommends a minimum of such activities to help promote awareness of company objectives, it is critical of the fact that a median 44 per cent of effort is devoted to them. And, in some companies, trouble-shooting runs to an incredible 92 per cent.

To remedy the situation, the consultants make a number of recommendations, including:

- more control by top management
- more planning and detailing of company goals
- independent status for R&D—with the director reporting, perhaps, directly to top management rather than to sales or manufacturing
- participation by the research head in general company planning
- greater coordination of research with other company functions
- a greater spread in pay between recent graduates and experienced, mature researchers.



THERMOPLASTIC PAPER: *New formable X-crepe, at top, unlike conventional kraft paper, doesn't crack when stretched.*

Paper Rivals Plastic

A special, stretchable kraft paper developed by Cincinnati Industries, Inc., promises to perform many packaging jobs more economically than plastic, and find new parts applications as well.

So far it has only been formed into various packages, both rigid and flexible (see photo, left), but possible end-products include instrument panels and door panels with integral arm rests for cars, and even toe and heel structural parts for shoes.

The paper, which can be stretched 60 per cent, ranges in thickness from a sheet a few thousandths of an inch to multi-ply types, laminated with resins, up to a quarter of an inch thick. The resin used is high impact polystyrene, but other resins are under evaluation. The resin adds rigidity and a waterproof surface.

Better Plant Protection

The announcement that all White House employees will now carry color identification photos, instead of the old black and white pictures, highlights a trend toward this improved security measure. The Atomic Energy Commission is following suit, and a number of companies are adopting this improved identification method.

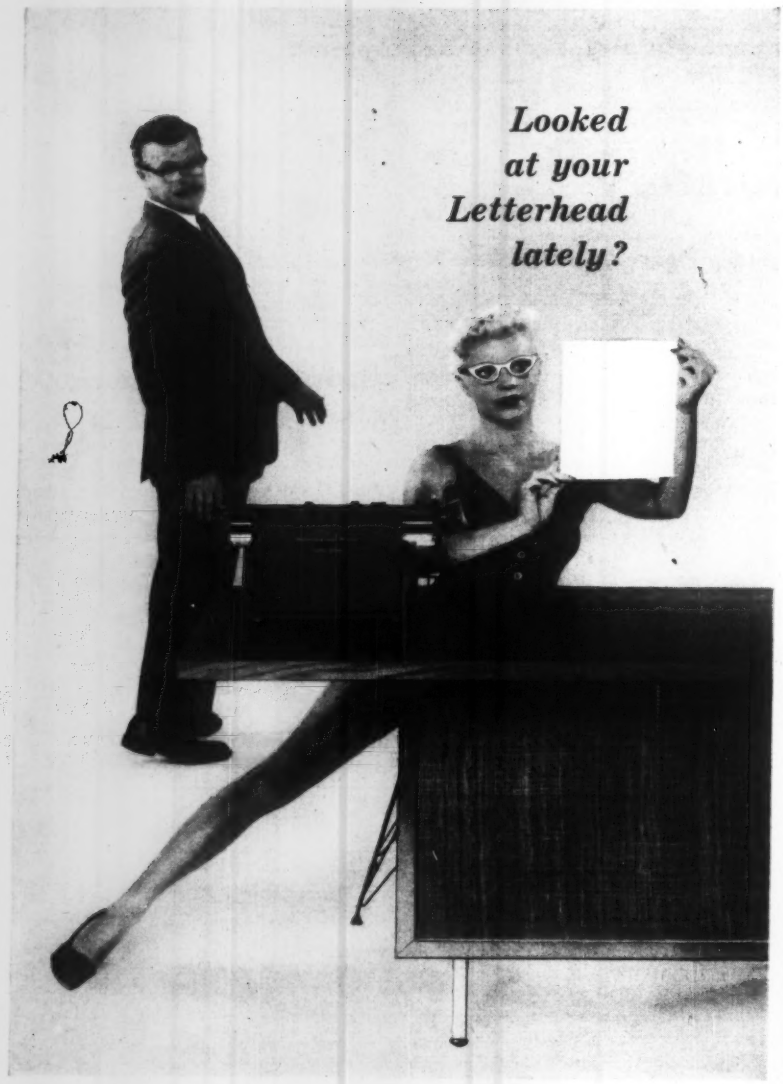
Cooperative Research

When a company can't afford a research project or hasn't the capability for making full use of the results, the logical answer is to share the costs—and the results. For some years now, companies have been sharing R&D costs through their trade associations (collectively spending about $26 million annually for this purpose). But a growing trend is toward sharing of costs between a few noncompeting companies.

GLASS VS. ICE: *An electrically conductive coating on this rear view mirror developed by Corning Glass Works heats the glass and removes ice. Already available for trucks and outdoor industrial vehicles, the new accessory will soon appear on cars.*

The latest example is a new brazing method developed by Armour Research Foundation Chicago, under a joint contract from Twin Coach Company of Buffalo and Grumman Aircraft Engineering Corp. of Bethpage, N.Y. Originally developed for the Air Force, the "quartz lamp process" was brought up to a production method by the new contract.

Twin Coach had the idea for the further development and approached its old customer, Grumman, to share the ex-



Perhaps it's time for a fresh design and a bright new **WESTON** *paper*

Your printer, advertising agency or letterhead designer will gladly suggest a new design and a paper of appropriate quality from the complete family of Weston cotton fiber letterhead papers — including Old Hampshire Bond (Extra No. 1, 100%), Defiance Bond (100%), Winchester Bond (50%), Weston Bond (25%) and Weston's Hand Weave (25%). Write Dept. **DR** for samples.

BETTER COTTON FIBER PAPERS

Better Papers are made with cotton fiber

WESTON PAPERS · PROTECT YOUR RECORDS ·

BYRON WESTON COMPANY
Dalton, Massachusetts
Makers of Papers for Business Records Since 1863

WESTON PAPERS

Leading Makers of: LETTERHEAD PAPERS • POLICY PAPERS • LEDGER PAPERS • INDEX BRISTOLS

pense. In the past, the two companies have shared research costs performed in one or the other of the company labs. However, this was their first venture in cooperative contract research.

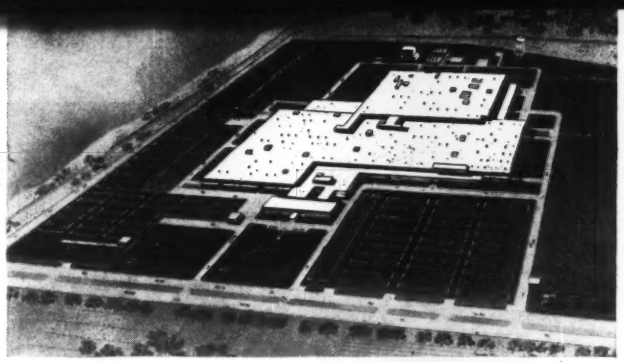
New Methods, Materials, and Equipment

Clear plastic: Just as mixing two metals often results in an alloy that is stronger than either, mixing two plastics can lead to a better product. Following this principle, Dow Chemical Company, Midland, Mich., has produced a copolymer molding plastic called Zerlon. Tough, clear, and easily processed, Zerlon is suitable for dials, escutcheons, and decorative items. It costs around 50 cents a pound.

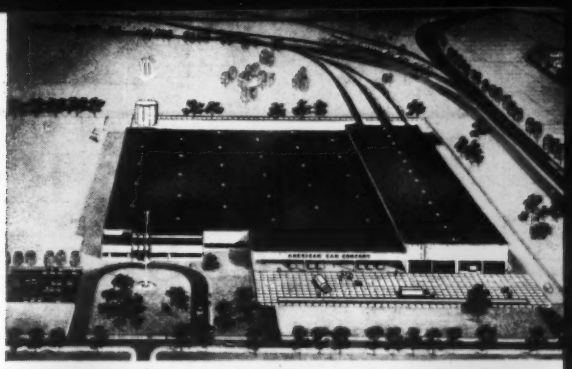
Heat meter: A new device measures the amount of heat used in an industrial process by summing the difference between input and output temperatures in heating water lines. Called the Pollux BTU meter, it is available from Air Conditioning Equipment Corp., New York.

Fleet washing: A chemical that destroys electrostatic charges is the key element in a new vehicle washing system of interest to companies that operate fleets of trucks or cars. As a result of the chemical's action, a truck can be cleaned in about ten minutes without brushing or rubbing. The equipment incorporat-

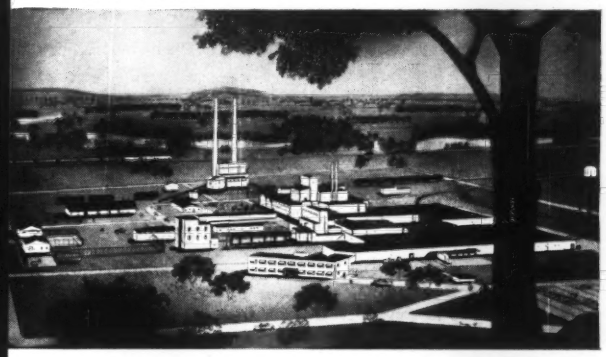
HIGH HOLDER: *Many companies use this Lantz "Hi-Hoist" in place of the extra man usually needed to hand tools and materials to a maintenance man working on a ladder.*



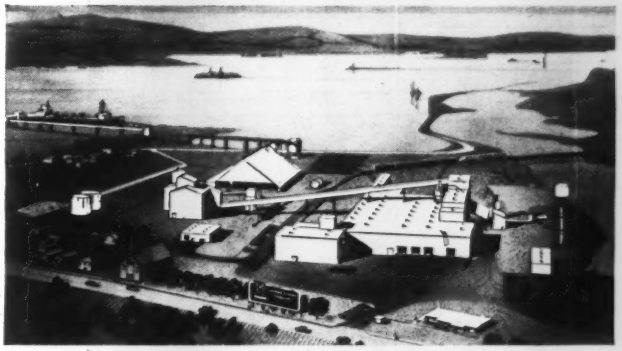
"PERFECT SITE" SAYS FORD of 203-acre site at Lorain, Ohio for its new assembly plant found with the help of the Central.



"CLOSE TO OUR SUPPLIERS" says American Can Company of Hammond, Indiana site for its new coil-processing center found with the help of the Central.



"GREAT NEW CELLOPHANE PLANT" owned by Olin Mathieson Chemical Corporation at Olin, Indiana, located with the help of the Central.



"IN HEART OF MARKET" U. S. Gypsum new multi-million-dollar plant at Stony Point, N. Y.; the site was developed with the help of the Central.

What the New York Central has done for these site-seekers—*it can do for you!*

Ford Motor Company, American Can Company, U. S. Gypsum, and Olin Mathieson are only a few of the many companies which have made use of the New York Central Plant Site Consulting Service to spot worthwhile locations for their new plants.

Don't think for a minute that this service is limited to large companies. Literally hundreds of firms of all sizes have made use of this Central service in the last two or three years. Completely confidential, it is available without charge. Appraisals are carefully tailored to your type of operation and to your markets.

At the present time, we have many worthwhile plant site opportunities on tap which are described in detail in illustrated folders, on the industrial areas listed in box.

Your inquiries are invited. For more information, write to: Arthur E. Baylis, Vice President, Dept. E, New York Central Railroad, 466 Lexington Avenue, New York 17, N. Y.

Plant Site Opportunities

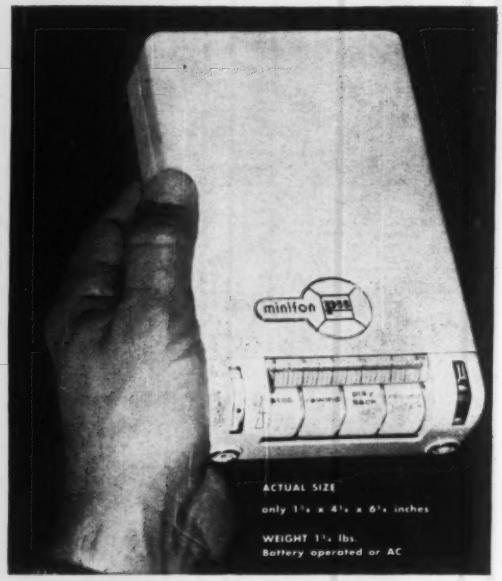
New York Central has 15 illustrated brochures filled with details on the following industrial areas. Feel free to write for the ones you want.

1. Albany, Troy, Schenectady
2. Ashtabula
3. Buffalo-Niagara
4. Cal-Sag (Chicago Area)
5. Chicago
6. Cleveland
7. Detroit
8. Elkhart
9. Gardenville, N.Y.
10. Industrial Parks in Ill., Ohio, N.Y., Mass., and Mich.
11. Rochester
12. St. Lawrence Seaway
13. Syracuse
14. Utica
15. Youngstown

Large or small, there's a "Central" location on the modern 11,000-mile rail network of the New York Central System that meets your plant site requirements.

Amazing Precision Pocket-Size Recorder

Now Records Up To 4 Hours Plays Back Immediately!



Minifon

Smallest, Lightest

RECORDER

•

Records Everything

•

Takes Notes

•

New Low Price

"Minifon Does Best Job", *says Executive!*

"I've tried other types of recorders and have discarded them all since I learned about MINIFON." Nothing can match the convenience and lightweight of this remarkable pocket-size, highly faithful recording instrument." Today major industrial concerns insist that their executives carry Minifon recorders on all business trips, because Minifon is the only foolproof way to record on-the-spot information from contacts in the field.

Minifon hears everything said and forgets nothing—eliminates the time, labor and errors-of-memory that go into written reports. And a Minifon with automatic push button controls is ready to take notes any time, anywhere, under any conditions—you can even "talk to it" while driving a car or flying a plane! For details and **NEW LOW PRICE** mail coupon below!

GEISS-AMERICA, CHICAGO 45, ILLINOIS, Dept. DR-2
Exclusive U.S.A. Importers

Please send me completely illustrated brochure on the MINIFON recorder.

Name_____

Name of Company_____

Address_____

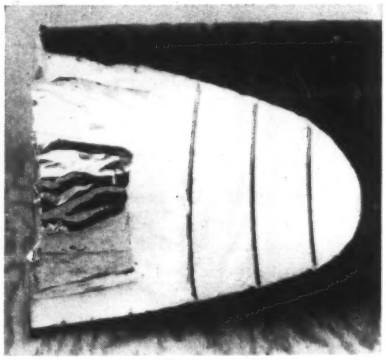
City_____ State_____

FIRE PROOF: *To prove that its latest motors can operate at extreme high temperatures, Westinghouse engineers set one down on a gas range. Various inorganic insulation materials were developed to enable this motor to run at more than 1,000°F.*

ing the chemical is available from Allied Structural & Plate Corp., Chicago.

No runs in this hose: All-Dacron jackets are the new industrial fashion—as a covering for fire hoses. Companies whose plants are plagued with corrosive atmospheres find the new B. F. Goodrich fire hose lasts much longer.

Cost-cutter: Cutting rates on high-alloy steels can be increased at least 25 per cent, and as much as 33 per cent, with a new cutting fluid developed by Shell Oil Company, New York. The water-soluble fluid, Dromus E, should be used with throwaway carbide insert tools.—M.M.



LIGHT-WEIGHT DUCTING: *This self-insulated air ducting is strong enough to be buried underground to carry heat to outlying plant buildings. Developed by Standard Plastics, Inc., Fogelsville, Pa., the ducting is urethane foamed around a steel coil and wrapped with waterproof polyethylene.*

Ryder Truck Rental

enables modern management to achieve uninterrupted trucking operations. Renting Fords or other dependable trucks from Ryder lets you budget transportation costs in advance, release vital working capital, keep executive talent free of truck-management problems. Ryder's transportation engineers can show you how!

RYDER SYSTEM, INC.

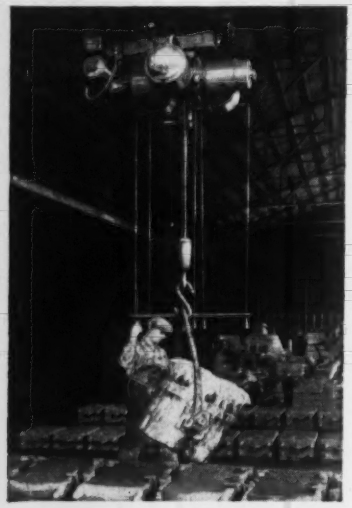
GENERAL OFFICES: ENGLE BUILDING, P. O. BOX 33-816, MIAMI, FLORIDA

Ryder System, a fast-growing publicly-owned company, also operates modern truck lines in 20 Eastern and Southern states. Write today for information on Ryder System or for brochure, "How Modern Management Can Profit from Truck Leasing."

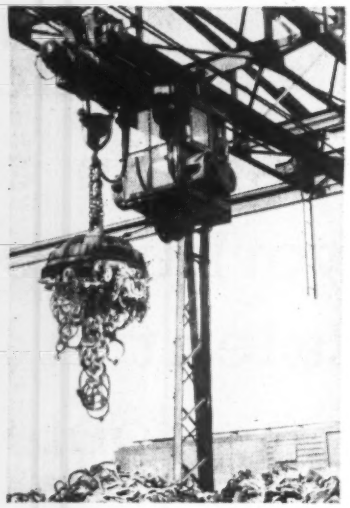
SHEPARD NILES
HOISTS

CUT HANDLING COSTS

in YOUR plant with the right hoist



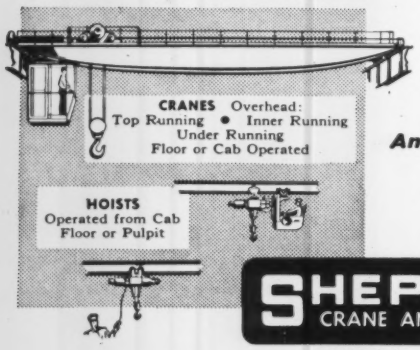
FLOOR-OPERATED HOIST
Operator primarily occupied with other duties, uses hoist for fast, efficient short hauls.



CAB-OPERATED HOIST
Cab operator moves loads at high speeds, can quickly spot material for handling.

WHICH Shepard Niles hoist fits your plant's needs . . . a floor-operated hoist where the operator is freed for other duties or a cab-operated hoist where the operator is engaged full time moving loads through the air? Shepard Niles manufactures both types in capacities from 1 to 20 tons.

Send for the descriptive bulletins on both Cab and Floor Operated Hoists . . . or ask that a Shepard Niles representative call — there's NO OBLIGATION.



Building
America's Most Complete Line of Cranes and Hoists Since 1903

SHEPARD NILES
CRANE AND HOIST CORPORATION
2995 Schuyler Ave., Montour Falls, N. Y.

IT PAYS TO BE WEATHER-WISE

continued from page 45

For another pharmaceutical concern, Weather Trends did an analysis of the previous Summer to determine if the sales of a suntan lotion should have been greater for different market areas. This latter study was strictly climatological, while the poison ivy and hay fever jobs included a long-range forecast, interpreted for the client's specialized needs.

Climatology is closely related to meteorology. Sometimes a client only needs a good summary of climate in each of his markets. Weather Trends devised a simple map for a clothing manufacturer which shows the "average dates of first topcoat weather" in cities throughout the United States. The manufacturer uses the map in planning his co-operative advertising with retailers and has distributed copies of the map to all customers as an aid in their own sales promotion work.

A matter of psychology

In helping to make marketing decisions, a consultant firm like Weather Trends often needs to go beyond the science of meteorology itself and determine the effect of weather upon consumer psychology. For example, the client may need such information as:

- Is it better to advertise an air conditioner on the first or third day of a heat wave, bearing in mind the importance of the competition's plans?
- Do warm, humid nights stimulate demand better than hot afternoons?
- Will newspaper stories about 90-plus temperatures have a psychological effect, even though the discomfort index is not too high?
- Do the answers to such questions differ in various parts of the country and at different times of the year?

Not all weather consultants handle such a wide range of problems, however. Some of the weather experts engage almost exclusively in rain-making. Such a firm is W. E. Howell Associates of Lexington, Mass. Most of its work is for hydroelectric companies, sugar refiners, paper makers, and some large agricultural and state clients.

Another company, the Allen Weather Corp., tends to specialize in navigation problems. Its president, Louis Allen, has developed a ship weather-routing system which the Maritime Administration has found results in an average saving of $5,954 per passage in time, fuel, and heavy weather damage. Instead of simply sending their ships over the traditional routes, steamship companies operating throughout the world get Allen to pre-compute the best route for the particular ship and cargo before each ship leaves port.

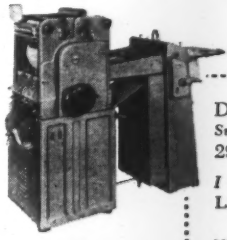
Other consultant concerns like Weath-

"HOW CAN WE GET THIS PRICE CHANGE OUT IN AN HOUR?"
"GEORGE'S DUAL-LITH. HOW ELSE?"
"HOW ABOUT THOSE FORMS, GEORGE?"
"LETTERHEADS? LET GEORGE DO THEM."
"I EXPECT THAT MEMO IN 20 MINUTES, GEORGE!"
"THERE ARE TIMES WHEN I ALMOST WISH WE DIDN'T HAVE A DAVIDSON DUAL-LITH!"

No matter what the demand, seems George *can* do it – on the DUAL-LITH! This is a picture of George's DUAL-LITH . . . there are a number of other models – if you need 'em. And every one is designed to turn out quality offset – *fast!*

The DUAL-LITH is the ultimate in simplicity. It's inexpensive to own and to operate. And it speeds your paper work no end! We could tell you here about each and every one of the DUAL-LITH's features and advantages. But we'd rather make this statement: Nobody in the world makes better small offset equipment than DAVIDSON! And if taking the *work* out of paper work is one of your problems – you really ought to find out more about DUAL-LITH!

Call your distributor (he's listed in the Yellow Pages) – or send the coupon to us today – for free descriptive folders about the many DUAL-LITH models! Davidson Corporation, 29 Ryerson Street, Brooklyn 5, New York. Subsidiary of Mergenthaler Linotype Company.



Davidson

DAVIDSON CORPORATION
Subsidiary of Mergenthaler Linotype Company
29 Ryerson Street, Brooklyn 5, N. Y.

I WANT to know more about DUAL-LITH. *Send free folders!*

Name.....

Company.....

Address.....

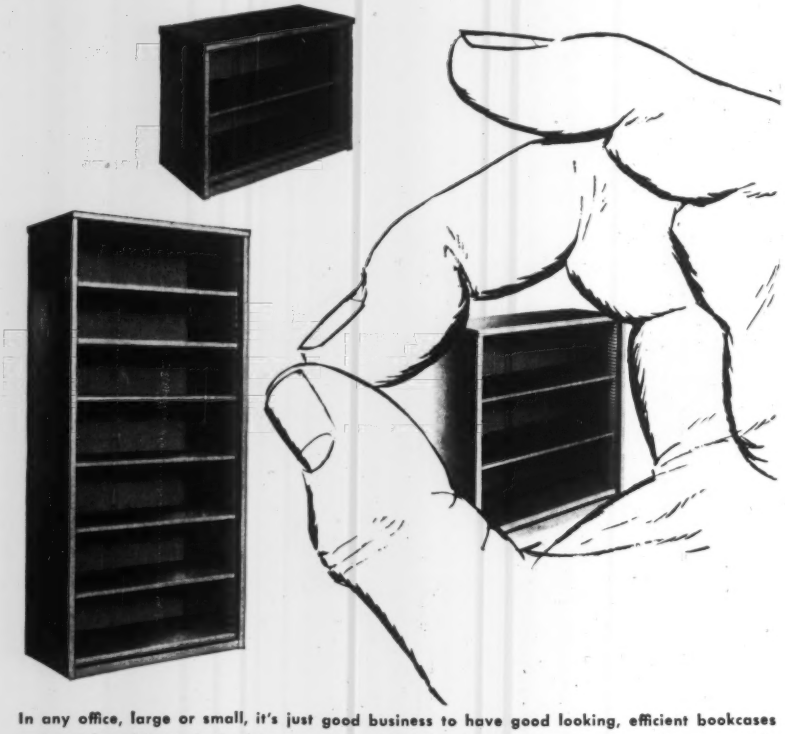
City.....Zone.....State.....

DR-259

from coast to coast

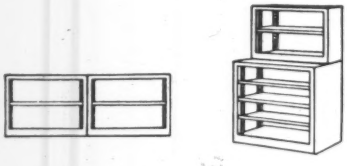
BORROUGHS
BOOKCASES and SUPPLY CABINETS

get the OK for design and value



In any office, large or small, it's just good business to have good looking, efficient bookcases and supply cabinets. And when you can get the best in appearance and quality at sensible prices, there's no need to look further. Borroughs has bookcases and supply cabinets to improve any office. There's a wide range of sizes and styles, from 29" to 84" high units, with or without doors, and in a choice of 4 modern colors. If you want more facts quickly, do this today . . . **send for literature**

All models have sliding shelves that are adjustable without bolting.



These setups show how attractively and efficiently you can arrange Borroughs cabinets—two 29" cabinets side by side—a 29" x 12" cabinet on top of a 42" x 18" cabinet. Many other combinations can be created to suit almost any situation.

BORROUGHS MANUFACTURING COMPANY OF KALAMAZOO

A SUBSIDIARY OF THE AMERICAN METAL PRODUCTS COMPANY OF DETROIT

3064 NORTH BURDICK ST. amp® KALAMAZOO, MICHIGAN

er Corporation of America handle a wide range of weather and climate problems, specializing in rain-making, round-the-clock forecasting, and engineering studies. Weather Corporation's services are used by builders in estimating the degree of risk in bidding on fixed-time contracts and planning large jobs; by shipowners in planning routes; by gas or electric companies in load-planning and meeting repair demands; by insurance companies and law firms in determining the role of weather in accidents and disasters; by department stores and retail food chains in forecasting consumer demands.

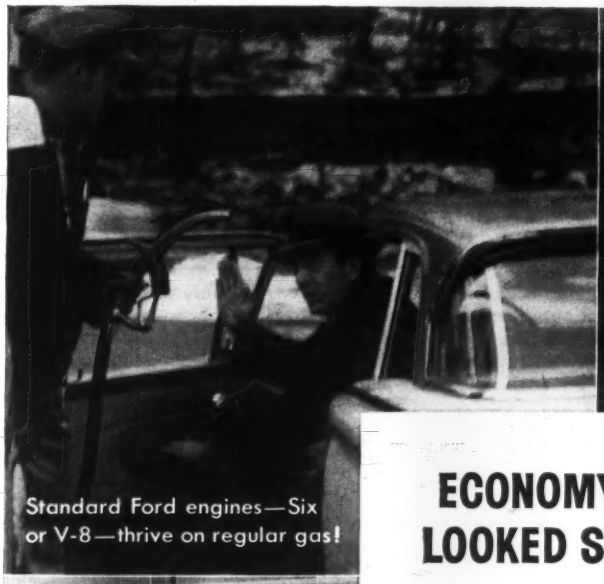
For steamship and stevedore companies, the Weather Corporation helps cut labor costs in loading and unloading ships. Once hired, every member of a crew is entitled to four hours' pay. At strategic times each day, the hiring bosses are told how much rain, if any, probably will fall during the period when labor is needed. They can then decide the risks in hiring or not hiring a crew. If the rain is likely to be light, hatch tents can be set up and the job can proceed, but if heavy rain is predicted, loading and unloading operations must be halted. If fog will delay the arrival of a vessel, the hiring of crews is postponed. Sometimes such advance information can result in a saving of several thousand dollars in a single day.

THE AUTHOR ● Frank M. Kleiler, who holds down the post of executive secretary of the National Labor Relations Board in Washington, is a free-lance magazine writer by avocation. His career includes stints as a reporter on the *Washington Evening Star* and the *Boston Herald* and Government jobs as clerk to the chairman of the National Mediation Board, director of disputes for the Wage Stabilization Board, and regional director for the NLRB in Pittsburgh.

Buying in the rain

For food chains, the Weather Corporation starts with an analysis to relate historic sales records with weather history and to find the buying patterns on cold, hot, or rainy days. It provides long-range weather probabilities used in advance planning and daily forecasts on which earlier plans are revised. The stores can then adjust their inventories, call in additional clerks in good weather, sell out perishable merchandise ahead of bad weather, adjust bakery schedules, and reduce transportation costs.

Almost every industry could plan its purchasing, manufacturing, and sales activities better if it had reliable weather forecasts for weeks, months, or years in advance. The Weather Bureau itself



Standard Ford engines—Six or V-8—thrive on regular gas!

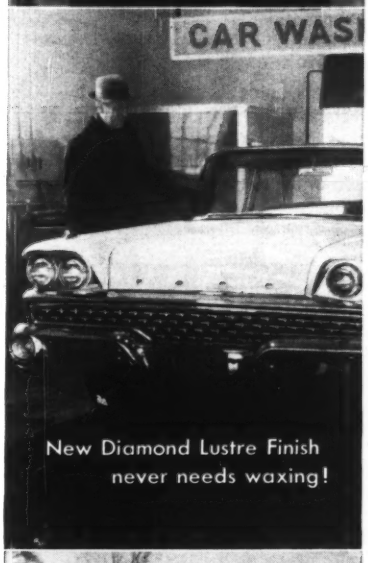
New aluminized muffler lasts twice as long!

ECONOMY NEVER LOOKED SO GOOD!

This 59 Ford is a specialist in cutting costs. With Ford's Mileage Maker Six or Thunderbird V-8, you use *regular* gas . . . for a savings of up to one dollar on every tankful.

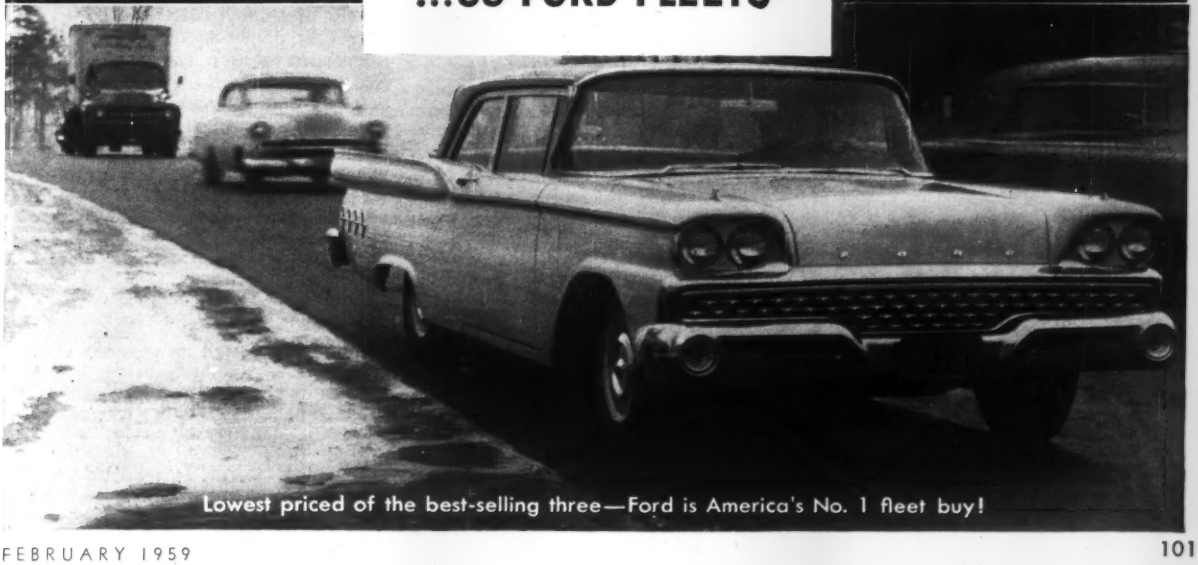
And this is only the start! Ford's new aluminized mufflers bring you *twice* the muffler life. You'll go 4000 miles without changing oil with Ford's new, standard Full-Flow oil filtration. Ford's new Diamond Lustre Finish never needs waxing or special upkeep—you polish simply by washing. Then, there are the famous low Ford prices. They *start* lower than any of the most popular three. When you wrap all this in Ford's elegant Thunderbird styling, you wonder how anyone could go anything but Ford for '59.

...59 FORD FLEETS



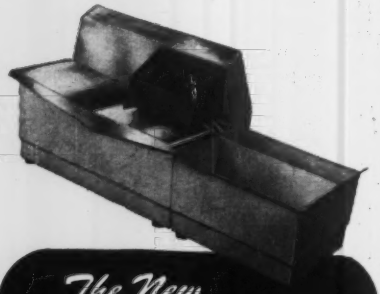
New Diamond Lustre Finish never needs waxing!

Savings and stamina make Ford New York's favorite '59 cab by 5 to 1!



Lowest priced of the best-selling three—Ford is America's No. 1 fleet buy!

WAITING FOR THE MAIL WASTES SALARY HOURS
GET FASTER MAIL DISTRIBUTION FOR 10 DAYS
FREE!



The New SPEED-O-PRINT Automatic MAIL OPENER

ELECTRICALLY OPENS UP TO 600 ENVELOPES PER MINUTE — ANY SIZE, ANY THICKNESS.

See for yourself how much sooner the day's work gets started when incoming mail is distributed and ready for attention mere minutes after its arrival. Use the Automatic Mail Opener in your office for 10 days without cost or obligation. See how it eliminates slow, costly hand work, how cleanly and safely it opens mail up to 30 times faster than old-fashioned ripping or slashing. *If your office receives more than 25 letters per day, you'll save time and money with a "Speed-O-Print Automatic Mail Opener Try it and see!*

SPEED-O-PRINT CORPORATION
1801 W. Larchmont Ave., Chicago 13

MAIL TODAY

Please send additional information and literature on your NEW AUTOMATIC MAIL OPENER.
☐ Also send name and address of your nearest authorized dealer.

NAME
ADDRESS
CITY STATE
ATTENTION

makes 30-day outlooks, but they are so generalized that they amount to little more than estimates of the rainfall and temperature for the next month. Inevitably, therefore, when a business man engages a private meteorologist he hopes for a better forecast than he could get from the Government. A private weatherman concentrating on a specific problem usually can state the weather probabilities or possibilities in terms which are more helpful in making business decisions than can the Weather Bureau, but long-range forecasting is the toughest problem that confronts the men in the weather business, and it's still a long way from being an exact science.

How far ahead?

The American Meteorological Society holds that "issuance of detailed day-to-day weather forecasts for more than two or three days in advance is misleading and is not justified by present meteorological knowledge." Yet there is a wide range of professional opinion on this point. "Requests for long-range forecasts," says Dr. Jerome Spar of New York University's Department of Meteorology and Oceanography, "elicit a wide variety of responses from the meteorologists—all the way from a flat refusal to give a forecast more than two days in advance to a cheerful willingness to issue specific day-to-day forecasts for years ahead."

Dr. Spar has found seven different techniques being used by long-range forecasters, but he reports a shortage of information on the accuracy of such forecasts. Long-range forecasts usually are made only in response to a specific request, and there is no systematic or objective way of verifying them.

Long-range forecasting methods probably will improve with more study and experience. Until they achieve usable accuracy, Dr. Spar believes that the services of meteorologists to industries must be in the area of climatological estimates and analyses. "An intelligent and discriminating application of climatology," he says, "can be of great service to industry in reducing weather-connected losses and increasing operational efficiency. Many industries are already aware of the great reservoir of climatological data that is available to them, and some are learning how to apply the data."

Uncle Sam lends a hand

At one time it appeared that the Weather Bureau and the private meteorologists might become professional rivals. In 1953, the Department of Commerce created an advisory committee on weather services consisting of meteorol-

How Weathermen Work for Industry

The weather forecaster can offer a valuable assist in almost every area of business management. Here are some of his specific functions.

PRODUCTION—Wherever the manufacture of a product is affected by weather, meteorologists supply interpretative forecasting to permit better planning of work schedules.

ADVERTISING — Weather probability studies enable advertisers of seasonal items to time their campaigns for increased effectiveness.

SELLING—Correlation of weather history with sales records makes it possible to estimate markets and fix realistic sales goals or quotas.

INVENTORY CONTROL — Where weather affects the procurement or use of materials, careful forecasting prevents purchasing agents from being caught with inventories too low to provide a safe margin or too large to store economically.

SHIPPING—Choosing the best route for a truck or an ocean liner is done better with the help of an up-to-the-minute forecast at the time of departure.

CONSTRUCTION — Scheduling such work as the pouring of cement or painting is done more efficiently with pin-point weather forecasting.

NEW PRODUCT DEVELOPMENT—Expert weathermen supply specialized advice in designing airplanes for trans-oceanic service, developing paints for the South American trade, making blue prints of prefabricated houses to sell in Alaska, or designing any item affected by climate or weather.

CHOOSING PLANT SITES—If heat, cold, or rainfall make a difference in economy of plant operation, a good climatologist can assist in finding the best locations.

PLANT DESIGN—Architects are turning to meteorologists and climatologists for advice on such diverse questions as how high a smokestack must be to hold air pollution to the minimum and how much insulation is necessary to reduce heating or air conditioning costs in a given part of the country.

INSURANCE—Weather studies help self-insurers and insurance companies in determining the weather factors in accidents, estimating the odds of property loss in the event of disasters, and establishing "design" conditions before risks are calculated and rates set.

ogists outside the Government. The committee found "a feeling among many Weather Bureau employees that encouragement of private meteorology is incompatible with the growth of the Bureau." Concluding that they were not getting the cooperation from the Government they deserved, the private weathermen recommended changes by which the Bureau would actively encourage the growth of private meteorology.

The Weather Bureau soon was advising business concerns to hire their own meteorologists or use consultants instead of calling upon the Government for specialized counsel on weather problems. In 1957, the relationship between the Government and private weathermen was described by Louis S. Rothschild, who was then Under Secretary of Commerce, as follows:

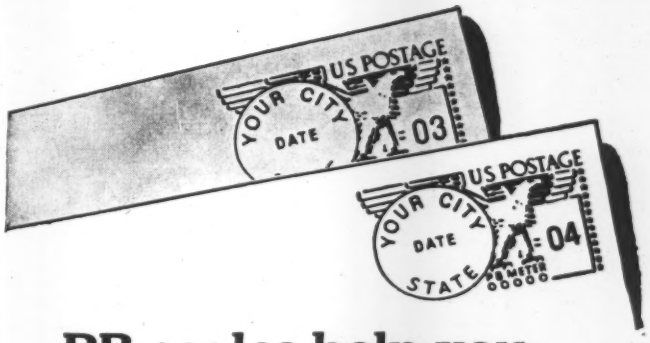
> The Weather Bureau normally acts as a *wholesaler* of weather information, while the private meteorologist normally acts as a *retailer;*
>
> The Weather Bureau observes, collects, analyzes, and distributes the basic weather information on which all Government and private meteorologists depend;
>
> The Weather Bureau normally provides information to an entire industry, while the private meteorologist normally provides information to individual companies in that same industry.
>
> The Weather Bureau normally provides information to all individuals in a community, while the consultant weather firm normally provides information to relatively few clients in that community.

Salaries and services

Meteorologists can be hired at salaries comparable with those of engineers. The range is from $6,000 a year for a beginner to a top of about $18,000. Meteorological consulting firms charge anywhere from $25 for a short-range forecast to $20,000 for comprehensive annual service. The American Meteorological Society wants to maintain professional standards. Business men can check on the services of anybody in the field by contacting the AMS headquarters in Boston.

Consultant and staff meteorologists use about the same basic weather and climate data supplied by the U.S. Weather Bureau. The maps, reports, statistical tables, and scientific research reports are sold at cost, and for a monthly fee any private meteorologist can hook on to one or more of the Weather Bureau's Teletypewriter systems.

Many business men have become expert in the use of official Weather Bureau information to solve their specialized problems without the help of private weathermen. These amateurs are finding it increasingly difficult to compete with the professionals who have mastered the tricks of locating the



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Pitney-Bowes' mailing scales are fast-acting, accurate and dependable, with widely spaced chart markings that can be read *correctly* at a glance.

There are models for every office, large or small, including a parcel post scale of 70 lb. capacity.

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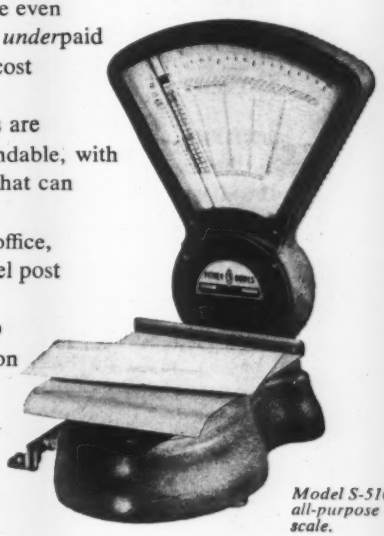

Model S-510, all-purpose scale.

FREE: *Handy desk or wall chart of latest Postal Rates, with parcel post map and zone finder.*

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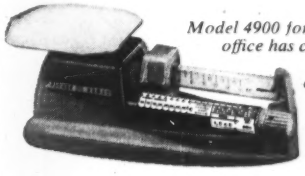

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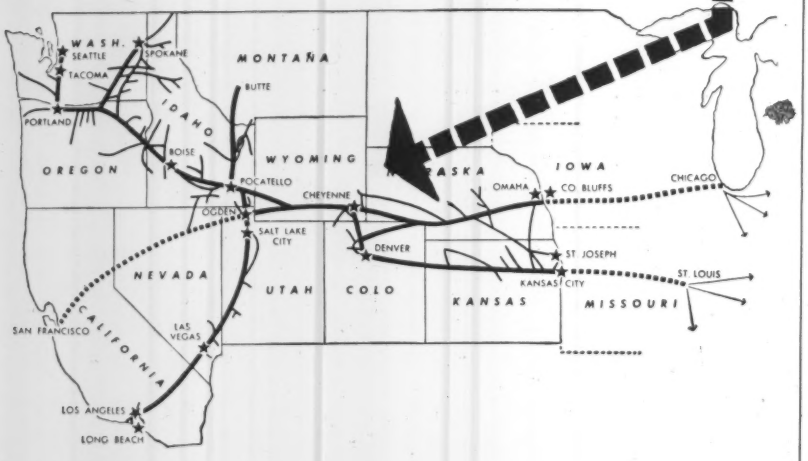

UNION PACIFIC RAILROAD

Industrial Development Dept.

UNION PACIFIC *Railroad*

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needed data quickly and translating it into practical advice on business problems, but there are certain jobs which can be managed on a do-it-yourself basis.

Little meteorological expertise is required to correlate a specific business activity with weather conditions. Wholesale bakers know from recorded experience which retail outlets sell less bread on rainy days (because the shoppers stay home) and which outlets sell more on the same days (because they provide telephone delivery service or are located near a convenient bus or train stop where the husband can buy a loaf on the way home from work). By keeping close tabs on the local weather forecasts, they can adjust route deliveries accordingly. Many department stores regularly attach weather reports to the daily sales records. They use them in determining the "planned" sales figures for the same day a year later, making an appropriate allowance for the weather.

Weather facts for sale

Do you need climate information in planning a sales and advertising campaign, estimating a market, or selecting a new plant site? An expert climatologist may answer your questions quickly and precisely, but many business men are getting what they need directly from Weather Bureau publications at nominal cost. For 20 cents you can get a book containing 46 charts showing climatic data throughout the United States. For a nickel a copy you can have a more detailed summary for each state or territory, containing climatic tables, precipitation and temperature tables, special frost tables, and supplementary information. If your business is world-wide, another nickel will bring you a pamphlet showing the mean and extreme temperatures and the monthly and yearly precipitation for each of 387 reporting stations outside the United States. A twenty-page price list of specialized weather and climate publications can be obtained free by writing to the Superintendent of Documents, Government Printing Office, Washington 25, D.C.

Francis W. Reichelderfer, chief of the U.S. Weather Bureau, tells of a survey several years ago which showed savings of more than $1 billion annually in business, industry, and agriculture by the routine use of the Government's daily reports, forecasts, storm warnings, and climatological data. T. F. Malone, director of research for the Travelers' Insurance Company and a pioneer in applied meteorology, observes that "a 25 per cent improvement in the effectiveness of applying weather data would mean an additional saving of a quarter of a billion dollars a year." END

Which Dwyer compact kitchen fits your business needs?

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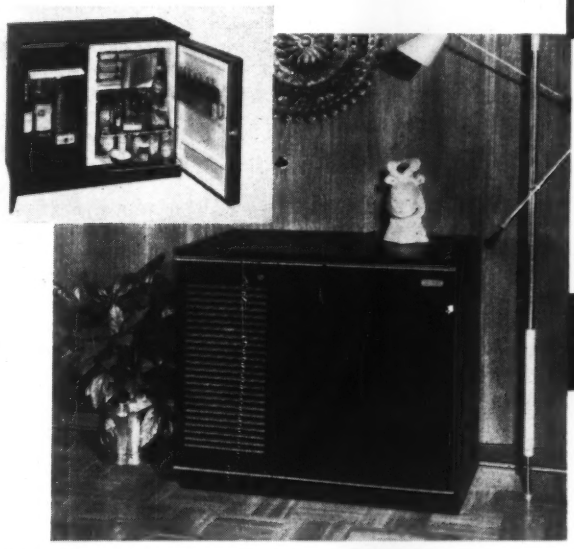
A flick of the finger lifts the top to reveal a deep sink and electric range. Below is push-button refrigerator with large freezer for plenty of ice cubes, plus storage cabinet and cutlery drawer. Key lock. Also available without sink. Blonde or dark mahogany color.



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The outlook for '59 at National Steel

Equipped with the largest ingot capacity and the most modern and efficient facilities in its history—results of a multi-million-dollar program of building and improvement—National Steel is better prepared to serve its customers than ever before . . . better prepared to supply expanding steel requirements basic to the continuing growth and prosperity of our country.

Result for 1959: greater capacity for standard steel products prominently identified with National Steel. Hot and cold rolled sheet and strip steels, for instance, for today's better automobiles and a wide range of other products for industry, farm and home; more tin plate for the billions of containers needed for the year's pack of food and countless other commodities.

Ahead for '59 at National Steel are further extensions of steel's utility—through a consistent program of research and development from which has come such recent National Steel achievements as:

New GLX-W steels—a major breakthrough in steelmaking . . . This new series of columbium treated, high-strength mild-carbon steels brings important *cost* and *weight* savings to steel users. Where design permits the replacement of carbon steel with GLX-W steels, weight savings of from 20% to 35% and cost savings of from 10% to 25% can be realized. When replacing alloy steels, the cost savings can range from 25% to 35%. With an exceptionally fine grain structure, the new series offers superior qualities of strength, toughness and weldability. These new steels come from the metallurgical research of our Great Lakes Steel Division, a leading producer of flat-rolled steels and of the famous N-A-X High-Strength steels.

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New zinc-coated steel. From metallurgical research of our Weirton Steel Division new types of zinc-coated steel have been developed: Weirkote with spangle-free surface, Weirkote with minimized spangle and Weirkote with differential coatings. These zinc coatings of Weirkote, including the conventional spangle surface, are applied by the new continuous method and will not flake or peel under any fabricating process used for *uncoated* steel. This quality eliminates the need for plating or dipping after fabrication in many applications. Weirkote and Weirzin, from our Weirton Steel Division, reduce the cost, add to the quality of finished products.

At National Steel, the outlook for 1959 is for a year of continuing improvement in facilities, products and service. If *your* outlook includes areas in which we may be of help, our organization is very much at your service. National Steel Corporation, Grant Building, Pittsburgh, Pa.

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SBA chief Barnes gives some pointers on the new law aimed at easing the little fellow's financing problems.

New Help for Small Business

PAUL WOOTON, *Contributing Editor*

THE BRAND-NEW small business investment Act will do more to stabilize and strengthen the over-all economy than any peacetime legislation since the passage of the Federal Deposit Insurance Act.

So says Wendell B. Barnes, head of the Small Business Administration, which will administer the law passed by Congress last August to provide financing facilities for small businesses.

Everybody benefits

Barnes' optimism is based on the fact that this new concept of corporate financing can be applied to a large percentage of the country's 4.3 million business establishments. He feels that his enthusiasm is shared by most of the financial community.

Lack of capital which has retarded the growth of thousands of small businesses now can be overcome, Barnes believes, by the establishment of private investment companies which will lend needed funds for sound financing, expansion, and new product development. The loans can run from five to twenty years. State and local development companies also may obtain loans for site acquisition and plant construction for small concerns.

While a major long-term effect of the Act will be the establishment of new companies, Barnes points out that the immediate benefits will come from providing going concerns with funds for modernization and expansion.

Tax relief spurs growth

However, tax benefits provided for in the Act already are resulting in the creation of new companies. Corporations with no more than ten stockholders now have the option of being taxed as if they were partnerships. An original investor in a small business may deduct stock losses within certain limitations. A taxpayer also has the option of paying the estate tax over a period up to ten years if the estate consists principally of small business holdings. A small business is allowed a three-year carry-back on new operating losses, and it may write off 20 per cent of the cost of depreciable, tangible personal property in the year of acquisition. The write-off, however, is limited to $10,000. The minimum accumulated earnings credit is increased from $60,000 to $100,000.

Administrator Barnes points out that licensed small business investment companies will be privately owned and privately operated. He sums up the main features of the investment act as follows:

How it works

Licensed companies will make loans and purchase debentures issued by small business concerns. The debentures are to be convertible into stock.

Small business investment companies will be licensed only after the need for small business financing in the area has been established.

Licensed companies must have a minimum of $300,000 paid in capital and surplus, but the Small Business Administration can purchase a maximum of $150,000 of subordinated debentures. In addition, SBA can lend such companies up to 50 per cent of their capital and surplus. For the purposes of the Act, these subordinated debentures can be treated as capital.

Wendell B. Barnes

Licensed companies are exempt from the Securities and Exchange Commission's requirements of 300 per cent asset coverage against borrowings and are eligible for certain discretionary SEC exemptions.

SBA will charter investment companies if state officials cannot grant such companies powers to operate under the Act.

Private funds must be employed in the program to the maximum possible extent. Federal funds to the extent of $250 million are authorized for loans to licensed companies and to state and local development companies. Of this sum, $50 million has been appropriated.

Funds also are available for use of schools and state agencies in research on the problems of small business.

An SBA division is in operation helping small concerns obtain Government contracts.

Regulations aren't so tough

There have been some complaints that the regulations implementing the Act are too technical and complex. Barnes admits the regulations are not simple, but they follow the requirements of the Act.

Although they are set up to make loans to small concerns which have been unable to obtain long-term loans, the small business investment companies are not going to grant loans without reasonable assurance of repayment. They will look for concerns with prospects for growth.

Barnes points out that loans extended to implement promising product ideas

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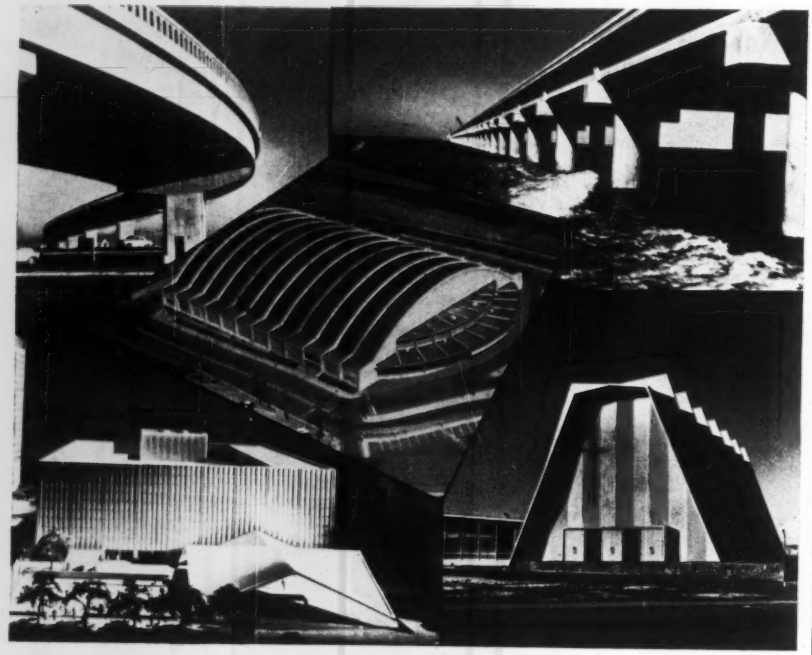

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15 PLANTS AND 4 TERMINALS SERVING SOME OF THE MOST RAPIDLY GROWING AREAS OF THE NATION

can foster business growth and advance the economy as a whole.

Major headache: investigation

A problem that will be common to all the investment companies is the high cost of investigating small concerns. Some think ten applicants will have to be examined for each one accepted. The investment companies will be looking for concerns whose net income can be brought up to the $150,000 or $200,000 level before they are turned over for public financing. However, the small business investment companies will have to compete with other concerns making venture capital investments. The SBIC loans are in no way subsidies.

Ten or more persons (fewer if permitted by state laws) may join in setting up a small business investment company. The SBA will purchase $150,000 of the company's subordinated debentures to help it get organized. They will be junior to other obligations of the company.

For the capital advanced to the small business, the investment company takes debentures which are convertible into the stock of the small business. It may also make secured loans of five years or more.

Banks and other investors may acquire the stock of the small business investment company. Bank holdings of such shares may not exceed 1 per cent of the bank's capital and surplus. Efforts will be made by some companies to confine stock ownership to the community in which the enterprise will operate.

Other provisions

The percentage of borrowings of an investment company to its paid-in capital and surplus may not exceed a ratio of four to one without SBA approval. SBA will charge 5 per cent interest on subordinated debentures purchased from the SBIC. The 5 per cent rate also will apply on loans from SBA to SBIC. An SBIC may obtain stock of small business concerns only through the conversion of debentures.

SBA is precluded from buying more than $150,000 of subordinated debentures in any one small business investment company where several are owned by the same group. Financing extended to any one small business concern by an SBIC may not exceed 20 per cent of the investment company's capital and surplus without special permission.

Existing state chartered investment and state development companies may convert to an SBIC with the approval of SBA.

SBA may make loans to state development companies, but the total loans outstanding may not exceed the total amount put up by other sponsors. Provision is made, in addition, for loans for specific small concerns. END

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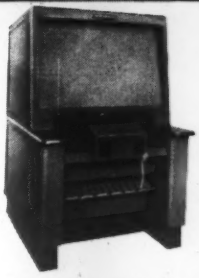

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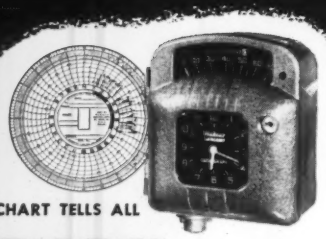

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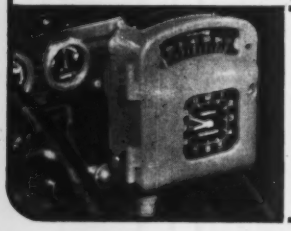

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MISSILE PROGRAM

continued from page 39

Once a missile has been assembled, it takes considerably more than the pressing of a button to get it off the ground —as pictures of the activity surrounding a countdown have proved to America. Ground support equipment at the launching site, in fact, is estimated to account for 70 per cent of the cost of an ICBM.

Ground support equipment

A recent study by the Aircraft Industries Association gives some interesting information on this little-known side of the missile program. The AIA study lists ten major items required for ground support of Bomarc, a 250-mile-range surface-to-air missile designed to destroy the enemy far from its intended target. Among these major support items are:

1. Missile exerciser: A device for putting the missile through a dry run to see that components are functioning properly.

2. Checkout bench: a variety of devices used to check the condition of the missile's electronic equipment.

3. Straddle transporter: An over-size straddle truck which moves the missile from its assembly and maintenance hangar to the launcher shelter and positions it on the launcher.

4. Launcher erector: A hydraulically activated mechanism, similar to a dump truck's unloading mechanism, which lifts the missile to a vertical firing position.

5. Jet fuel cart: A tank truck which supplies fuel for the liquid rocket which boosts the Bomarc up to the altitude where its ramjet engines take over.

6. Gasoline fueler: The tank truck which supplies the 80-octane gas used to power the two ramjet engines.

7. Acid trailer: Another tank truck which supplies the nitric acid which oxidizes the booster fuel and starts the booster motor.

8. Air and helium supply: Compressor plant (also including storage containers, dryer, refrigeration systems, receivers, and control cubicle) used to supply helium and high- and low-pressure air to missiles.

9. Beacon test equipment and launch

THE AUTHOR • Herbert C. Rosenthal left the trade paper field in 1944 to found Graphics Institute, of which he is the director. He has written for a number of national magazines, including *Printers' Ink*, *Pageant*, and *Coronet*. His most recent contribution to DR&MI was "On the Way: 193 Million Customers," November 1958.

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Auto-typist record "memory" roll operates the typewriter to write personalized letters . . . by automation!

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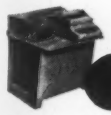
Send coupon for full information, and get your free copy of the new booklet, "60 Best Business Letters" to help you with your correspondence. Covers all types of business.



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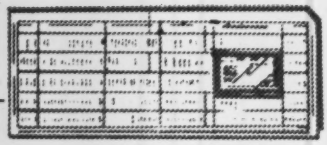

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control console: The places where the buttons are pushed which automatically check out, prepare for launching, and launch missiles within two minutes of the initial alert signal.

10. Cycle checkout van: A big repair truck which visits each launch shelter every six months and checks each missile for combat readiness.

Better business on Main Street

In addition to awarding contracts to manufacturers of specialized equipment, the missile program provides a general business stimulant to companies in areas where launching sites are built. The Army's Engineer Corps, for example, has awarded large contracts for the construction of missile bases to general contractors without special missile experience. Other local business men around missile bases and test centers supply fuel and transportation for the missiles, as well as shelter, food, and other consumer goods for the base personnel and their families.

During World War II, U.S. production of military aircraft topped 85,000 in 1943 and 95,000 in 1944. It then fell sharply until the Korean War, when military plane output hit 10,000 in 1953. But annual production goals for our intercontinental ballistic missiles and intermediate range ballistic missiles are only in the hundreds.

This explains the sad experience of the metalworking company which came to the Army's Redstone Arsenal with a plan to cut the cost of a small component the Arsenal was buying from $10 to $2–$3 per unit. All the company needed, it assured the Army, was $3 million to tool up for a 10,000 daily production run. Sorrowfully, the Arsenal officials explained that 10,000 units exceeded the *yearly* requirements.

Instead of going into the mass production of units, the big missile appropriations are being spent for skilled and highly-educated labor, delicate electronic equipment, and new developments in metallurgy, ceramics, and other fields.

A typical ballistic missile today costs about $100 a pound, even excluding the cost of the warhead—a considerably higher price per pound than an airplane. But fewer airframe pounds are required per missile. And, despite the

How Industry Gains by the Missile Program

The technological implications and benefits of the missile program are too numerous and pervasive to be set down in a manageable list, but they're visible in almost any company that is at all deeply involved in missile work. Just coming in contact with the advanced thinking and grueling demands of the missile makers has been enough to jolt many manufacturers out of technical ruts.

Missile making calls for teams made up of practically every type of technical specialist, producing valuable cross-fertilization of ideas as by-products.

Technological dividends can best be grouped under four main headings.

New manufacturing techniques: The most important new manufacturing technique stimulated by the missile program is numerical control of giant machine tools (see DR&MI, August 1958, page 46). These machines are not only faster but are capable of cutting hitherto impossible shapes.

Chemical milling is another advance. To create special tapers or depressions in parts, North American Aviation developed a fine technique for removing metal by acid etching.

Honeycomb construction, the strongest known, has been greatly advanced by missile makers. Forming of hard-to-cut alloys with explosives is another new manufacturing method that should soon be available to civilian industries. The missile makers have also pioneered new fastening methods of unusual tightness.

New products: All of the missiles that have been fired to date have been test vehicles. They contain delicate instruments whose output is relayed home by compact telemetering devices. These same machines can also be applied to remote control of factory processes and utility operations.

Three-dimensional TV may produce the big business that color TV thus far has failed to attain.

Some scientists see satellites as potential relay stations for intercontinental TV transmission.

There is also talk of using missiles to transport mail across the continent or to Europe in minutes. But this development may have to wait for the Buck Rogers era.

New materials: A number of metals that were either unknown, existed as laboratory curiosities, or were available only in gram lots, are now going into missiles (see DR&MI, October 1958, page 38).

Manufacturing capacity: Military necessity has forced the creation of large-scale production capacity in materials—such as titanium—that would not otherwise have been available in large quantity for decades.

Excluding the transistor and miracle drugs, practically all the great technical advances of our time have been paid for by defense budgets. As the missiles take over from manned aircraft, they should become our most important source of future technology.

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Statement of Condition as of December 31, 1958

ASSETS

Cash and Due from Banks	$1,767,601,412
United States Government Obligations	1,511,901,738
State and Municipal Securities	520,511,051
Other Securities	108,335,782
Loans	3,836,340,391
Customers' Acceptance Liability	98,668,993
Federal Reserve Bank Stock	18,600,000
International Banking Corporation	7,000,000
Bank Premises, Furniture and Equipment	47,129,511
Items in Transit with Overseas Branches	995,347
Other Assets	9,398,216
Total	$7,926,482,441

LIABILITIES

Deposits		$7,009,693,334
Liability on Acceptances and Bills		102,912,162
Foreign Funds Borrowed		1,245,700
Reserves:		
Unearned Income		33,878,912
Taxes and Accrued Expenses		57,293,047
Dividend		8,280,000
Shareholders' Equity:		
Capital (*12,000,000 Shares—$20 Par*)	$240,000,000	
Surplus	380,000,000	
Undivided Profits	93,179,286	713,179,286
Total		$7,926,482,441

Figures of Overseas Branches are as of December 23.

$543,001,604 of United States Government Obligations and $5,249,300 of other assets are pledged to secure Public and Trust Deposits and for other purposes required or permitted by law.

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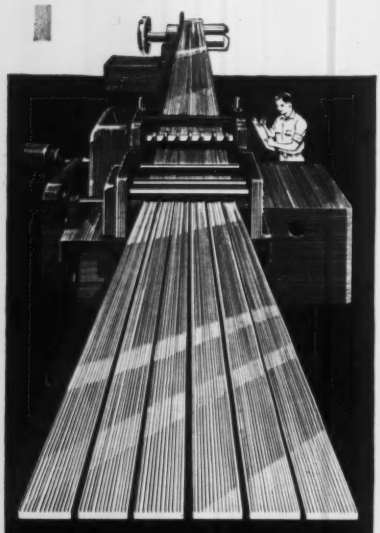

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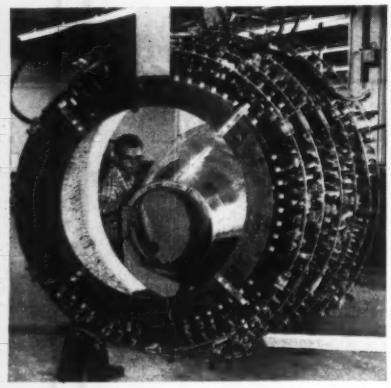


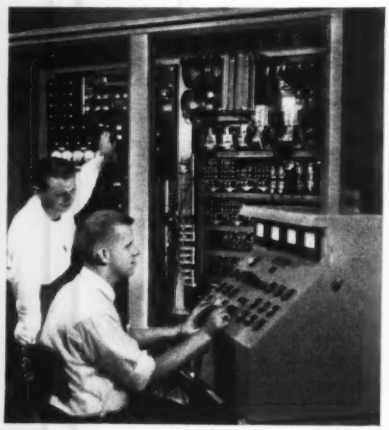
THIS CIRCULAR OVEN *was devised by Chrysler engineers to duplicate severe temperatures encountered by ballistic missiles reentering the atmosphere. The nose of a Redstone missile is readied for testing.*

higher sales price resulting from costlier labor and materials, missiles require 30 per cent less man-years production time than aircraft for the same dollar of sales.

Back in 1954, the Air Force was spending about 90 per cent of its procurement dollar for aircraft and only 10 per cent for missiles. In 1958, about 35 per cent of USAF procurement money was spent for missiles, and estimates are that this year the figure will be better than 50 per cent.

How this switch to missile development has affected the aircraft industry was recently described by Gen. Orval R. Cook, president of the Aircraft Industries Association:

These changing requirements on the part of our customers have dictated some major readjustments in the industry. There is, for instance, a trend toward fewer but more highly skilled personnel. The U.S. aircraft industry now employs about 750,000 persons, a drop of about 150,000 from



HIGH PRECISION *electric controls which will guide the launching of the mighty Atlas from Vandenberg Air Force Base, Calif., undergo exhaustive tests before leaving Rundel Electric Company, Millbrae, Calif.*

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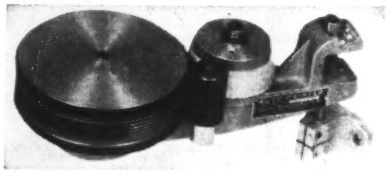

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mid-1957, but, on the average, the skill level of these employees has increased considerably.

At the same time, there has been a tremendous increase in the number of scientists and engineers in industry's total labor force. Accompanying this expansion in the size of this group has been a change in its composition, with virtually every scientific field now being represented on the research and engineering staffs of our member companies.

One interesting by-product of this increased emphasis on research and development is the emergence of many American universities as major missile contractors. More than 90 of them have secured contracts, and they continue to bid against private contractors.

In some cases, it's only fair to point out, sudden contract cancellations resulting from rapid obsolescence and Congressional budget-cutting make aircraft and missile manufacturing a risky business. For example, Chance Vought Aircraft, Inc., Dallas, recently lost a $100 million contract for the F8U-3, a Navy all-weather fighter, because Con-

How One Company Broke into the Missile Business

Delicate missile parts may seem a far cry from equipment for artificial breeding of cattle, but that's how far the Space Age has taken Standard Plastics, Inc., of Fogelsville, Pa.

When a company processing bull semen for the artificial insemination of cows asked Standard Plastics to come up with a packaging and insulating material which would keep the semen at an extremely low temperature, company researchers learned how to use urethane foam, one of the best heat insulators around. Urethane foam also happens to be an excellent shock absorber, although it isn't much heavier than soapsuds. Some of the giant corporations holding prime missile contracts heard of Standard Plastics' skill in packaging with urethane and approached the company to design a shockproof package for some of the costly electron tubes that go into missiles and their ground support gear.

Next, Standard Plastics was asked to make a giant storage container for the warhead of the mighty Atlas. After that came a foam container for the delicate instruments that go inside a nose cone to test its ability to reenter the atmosphere without burning up.

The net result was a burgeoning business in missile parts and accessories that may soon run into millions. All of which proves that even companies without the faintest apparent hope of cracking the missile market may really have the odds in their favor.

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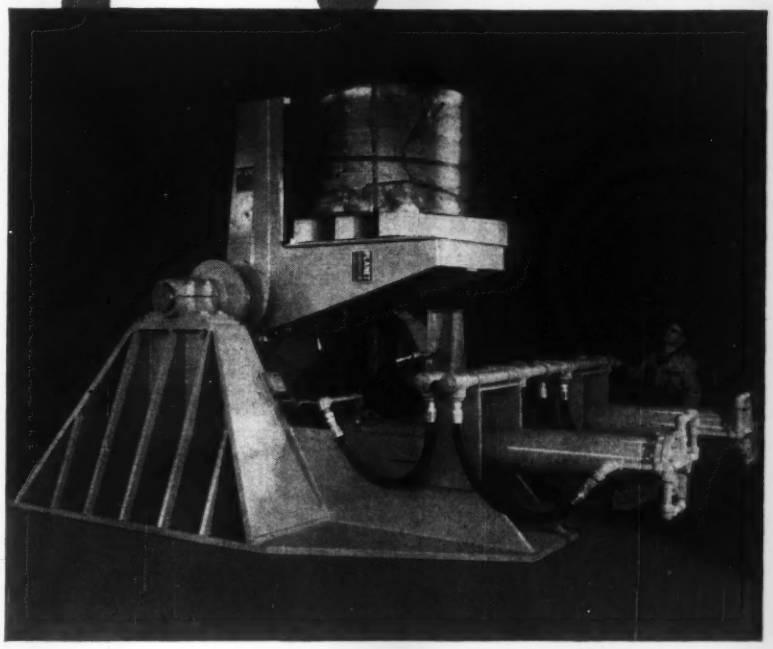

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gress told the Navy it could have only one new fighter of this type. The Navy, although it wanted the F8U-3, decided to keep the McDonnell Aircraft Company's F4H-1 instead.

Currently, aircraft companies hold an estimated 80 per cent of the prime contracts for major missile components—propulsion, guidance, and warhead, as well as structure. But the Chrysler Corp. has managed to dent the airplane manufacturers' line as the prime contractor for the Redstone and Jupiter. And some of the electronic and rubber companies have been selected for prime contracts. Reports have spread that General Motors and Ford (with its recently acquired Aeronutronic Systems, Inc.) are also actively looking for prime contracts.

What it takes to be a "prime"

A company seeking a prime contract should be able to assume full responsibility for system development and program management, Army Ordnance advises. Research and development contracts for an entire missile system are usually awarded, through formal advertising and negotiation, to one prime contractor, who has responsibility for initial production of all system components, including the missile and launching and handling equipment, as well as guidance, documentation, and testing equipment.

Various components, sometimes of a higher value than the prime contract, are procured on subcontract from other manufacturers. The smaller company, the Army advises, would do well to concentrate on superiority of individual components so that its reputation for reliability and superior performance will lead prime contractors to its door.

Industrial leaders, looking beyond its immediate military applications, see many uses for missile technology.

Hall Hibbard, Lockheed Aircraft vice president, foresees the development within the next 40 years of passenger-carrying missiles for domestic use. And Peter J. Schenk, a General Electric official, expects missile-launched satellite stations to circle the earth, transmitting back a picture of cloud masses to help improve weather forecasting.

Solar Aircraft is already at work designing a missile fire engine. Mounted on airport control towers, this missile would be electronically guided in 30 or 40 seconds to any airport crash. There it would drop by parachute a device which would automatically spray the wreckage with chemical foam to prevent fire.

Northrop Aircraft's Radioplane Division is designing a cross between a helicopter and a missile. It is hoped this pilotless gadget will perform such tasks as spraying crops from the air or laying cable. Radioplane already produces a camera-carrying guided missile for the Signal Corps that General Manager M. W. Tuttle believes can be used for map making, aerial prospecting, and forest surveys.

Hundreds of other peacetime uses for missiles are at various stages of gestation, from the half-formed idea to the detailed design drawing. It's a fair guess that whether or not your company takes an active part in the missile program, the products and by-products of missile making will have an increasing impact on your business for years to come. END

Where to Look for a Subcontract

Missile subcontracts aren't easy to come by, but if your company can prove, on a competitive basis, that it's fitted to make one or more of the thousands of different specialized components that go into the "big birds," you might find it well worth your while to approach one of the current (as of January 1) prime contractors listed in the table below.

Prime contractor	Missile	Service	Status
BENDIX AVIATION CORP., Mishawaka, Ind.	**Talos**	*Navy*	Production
BOEING AIRCRAFT COMPANY, Seattle, Wash.	**Bomarc**	*Air Force*	Production
	Dyna-Soar (a)	*Air Force*	Research
	Minuteman	*Air Force*	Development
CHANCE VOUGHT AIRCRAFT COMPANY, Dallas, Texas	**Regulus I**	*Navy*	Operational
CHRYSLER CORP., Detroit	**Jupiter**	*Army*	Production
	Redstone	*Army*	Operational
CONVAIR DIVISION, GENERAL DYNAMICS CORP., San Diego and Pomona, Calif.	**Atlas**	*Air Force*	Development
	Tartar	*Navy*	Development
	Terrier	*Navy*	Operational
CURTISS-WRIGHT CORP., Utica, Mich.	**Dart**	*Army*	Production
DOUGLAS AIRCRAFT COMPANY, Santa Monica, Calif.	**Genie**	*Air Force*	Operational
	Honest John	*Army*	Operational
	Little John	*Army*	Development
	Thor	*Air Force*	Production
EMERSON ELECTRIC COMPANY, St. Louis, Mo.	**Honest John**	*Army*	Operational
	Little John	*Army*	Development
FAIRCHILD ENGINE & AIRPLANE CORP., Hagerstown, Md.	**Bull Goose**	*Air Force*	Development
FIRESTONE TIRE & RUBBER COMPANY, Los Angeles	**Corporal**	*Army*	Operational
GENERAL ELECTRIC COMPANY, Utica, N.Y.	**Sidewinder**	*Navy*	Operational
GILFILLAN BROS., INC., Los Angeles	**Corporal**	*Army*	Operational
GOODYEAR AIRCRAFT CORP., Akron, Ohio	**Subroc**	*Navy*	Development
HUGHES AIRCRAFT COMPANY, Culver City, Calif.	**Falcon**	*Air Force*	Operational
LOCKHEED AIRCRAFT COMPANY, Sunnydale, Calif.	**Polaris**	*Navy*	Development
MARTIN COMPANY, Orlando, Fla.	**Bullpup**	*Navy*	Production
	Dyna-Soar (b)	*Air Force*	Research
	Lacrosse	*Army*	Production
	Mace	*Air Force*	Production
	Matador	*Air Force*	Operational
	Pershing	*Army*	Development
MARTIN COMPANY, Denver, Colo.	**Titan**	*Air Force*	Development
McDONNELL AIRCRAFT CORP., St. Louis, Mo.	**Green Quail**	*Air Force*	Development
NORTH AMERICAN AVIATION, INC., Inglewood, Calif.	**Hound Dog**	*Air Force*	Operational
NORTHROP AIRCRAFT, INC., Hawthorne, Calif.	**Snark**	*Air Force*	Production
PHILCO CORP., Philadelphia	**Hound Dog**	*Air Force*	Operational
RAYTHEON MANUFACTURING COMPANY, Waltham and Lowell, Mass.	**Hawk**	*Army*	Production
	Sparrow III	*Navy*	Operational
SPERRY UTAH ENGINEERING LABORATORIES, Salt Lake City	**Sergeant**	*Army*	Development
SYLVANIA ELECTRIC PRODUCTS COMPANY, Waltham, Mass.	**Plato**	*Army*	Development
TEMCO AIRCRAFT CORP., Dallas, Texas	**Corvus**	*Navy*	Development
WESTERN ELECTRIC COMPANY, New York	**Nike-Ajax**	*Army*	Operational
	Nike-Hercules	*Army*	Production
	Nike-Zeus	*Army*	Development

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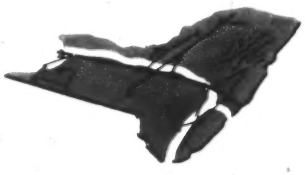

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This Telephone Program Pays Off

HOW GOOD are your company's customer relations? No better, probably, than the telephone manners of your employees. Courteous, intelligent handling of every incoming call is undeniably one of the best and easiest ways of making business friends and influencing prospects. But, beyond issuing occasional admonitions and reminders, not many companies have a positive program for "managing" this vital business asset.

One large concern, however, has come up with what it believes is a successful plan for reducing the number of lost sales and disgruntled customers traceable to bad telephone manners.

Employee cooperation is the principal ingredient in the continuing program for communications courtesy which has been in effect at the American Cyanamid Company since October 1957. Its plan, developed by Harold Dunning, communications supervisor, is designed to get three main points across to the company's 30,000 employees:

- Carelessness and rudeness in dealing with customers by telephone cost the company money.
- Discourteous telephone contacts within the company complicate the already difficult job of keeping the company's diversified, widely-scattered operations working together smoothly.
- The "telephone personality" each employee presents has a real bearing on his progress with the company.

Employees first were introduced to the Cyanamid program through interoffice memos which explained the objectives and listed the scheduled events. Next, showings of a twenty-minute slidefilm, "The Connecting Link," were arranged at all company offices and installations across the country.

The film's message is addressed to the secretary who forgets to take important messages; to the salesman who wastes his customer's time by not having data handy when he calls; to the bad-tempered employee who growls at all callers and slams down his receiver; to anyone who occasionally is guilty of other breaches of telephone etiquette.

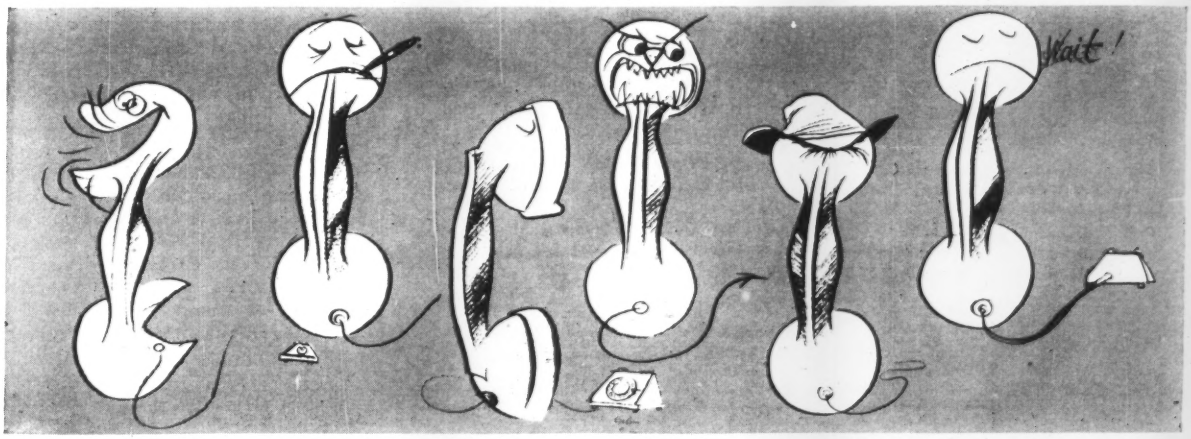
Cleverly written and illustrated articles appearing in the company's employee publications have helped drive home the point that "your telephone personality *is* you, your company, and your department." Robert Osborn, the well-known illustrator, was asked to create the cartoon images of several familiar "telephone personalities," including the mumbler, the gabber, and the shouter (see below).

American Cyanamid has broadened its communications improvement program to include instruction in sending and receiving Teletype messages and the courteous treatment of visitors. —C.K.

Here is a checklist of telephone taboos which American Cyanamid drew up to impress upon its employees that such breaches of telephone etiquette have costly consequences, and that "your telephone personality is you and your company."

DO YOU:

1. Fail to identify yourself when answering your phone at work?
2. Forget to take a message, or take a garbled, incomplete one?
3. Interrogate the caller with questions like "Who's calling?" and "What do you want?"
4. Leave the caller hanging for several minutes while you look up some fact, without first asking if he would rather have you call him back?
5. Carry on a conversation in your office while talking to someone on the phone?
6. Let the phone ring three or four times before answering?
7. Talk with a cigar, cigarette, or pencil in your mouth?
8. Bang down the receiver?
9. Just hang up when a call has been misdirected to you instead of transferring the caller to the proper department?
10. Fail to keep handy information you are likely to be called about?
11. Repeatedly interrupt a caller in mid-sentence?
12. Speak so indistinctly that you are asked to repeat several times?
13. Dial a wrong number because you *thought* you remembered it?
14. Have someone else place your calls for you?
15. Ask the long-distance operator to call you back when your party is on the line?
16. Sign off abruptly without giving the caller a chance to finish?



". . . and I said to him . . . and he said to me . . . and I said . . . and he . . ."

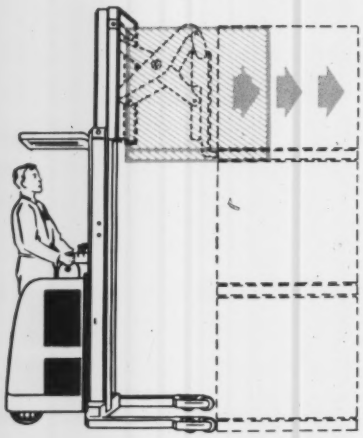
"H'lo, I wanna blumble the fluggle for more pwomisan. Okay?"

"Who? He's not here now . . . I don't know where he is. No, I don't know . . ."

"Miss Jones, get me Sam Whatsisname!"

"No, my name isn't Bill Brown . . . nope . . . nope, but you're getting warm."

*"Just a minute . . .



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GETTING WORLD TECHNOLOGY

continued from page 43

companies to obtain overseas process technology in areas where they will also have the opportunity to build any plants required. These plant design and construction concerns, such as Scientific Design Company, New York, and Blaw-Knox Company, Pittsburgh, offer the advantage of longtime overseas relationships and experience in translating European technology according to American standards. Through these companies, overseas processes have been translated into hundreds of millions of dollars in American plants.

Some foreign inventors also bring their creations to this country to market them. For example, the nation's leading telephone utilities are now studying a Belgian improvement on the common hand set. It was brought over by the inventors, Marcel and Robert Demeulenaere, who have already put it into production in Europe. The advance, called "Teledial," memorizes frequently dialed numbers which can be called simply by pushing a single button.

Although these methods of obtaining foreign technical know-how may suffice for many American concerns, most companies in fast-moving industries such as chemicals, plastics, electronics, and instrumentation can't afford to wait for news of foreign developments to be published. Articles submitted to foreign trade journals usually require from six months to two years for publication, and it takes from two to six months longer for abstracts to be translated and published. Other vital developments are withheld from publication or simply overlooked by the busy executive.

And, of course, once information on a new development is published, everybody is in the same position to bid for it. Companies naturally prefer exclusive deals under which they are the only ones authorized to manufacture and profit from a certain item.

The permanent observer's role

These companies find that they must have a direct pipeline to overseas sources. Most of them accomplish this by sending executives overseas on frequent visits, often in conjunction with an important gathering of technical men, such as the Atoms-for-Peace Conference. Others subscribe to various overseas intelligence services. But an increasing number maintain permanent representatives, mostly in Europe.

Many executives with long experience overseas favor the last approach, asserting that short visits are inefficient or even useless. They also say that foreign business men will not talk business unless they are well acquainted with the visitor or the company he represents. In

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addition, the competition among those going overseas for information is getting so intense that the neophyte often finds the best sources already tied up by his more experienced competitors.

Today there are some 70 technical observers in Europe ferreting out new ideas. They even have their own association, American Scientific and Technical Representatives in Europe, with headquarters in London.

Most of the observers are trained scientists and engineers, frequently of considerable reputation, and practically always holding an advanced degree. Their job is to gather information and spot possible deals. Situations calling for a considerable cost outlay or a licensing agreement are usually referred to higher authority. Observers can be expected to learn about new developments six months to two years before their problematical publication.

Although most of the 70 observers are employed by giant, diversified companies, one equipment maker with only 600 employees finds it worthwhile to maintain an observer in Europe.

Using European idea scouts

An alternate practice is hiring a European professional as a part- or full-time observer at a European salary. The disadvantage here is that the European can't be expected to know the American company and its requirements as well as an American. In general, this practice is recommended for the smaller company with narrower interests. The giant, diversified companies, with their greater interest in "fundamental" research, require observers who are long-time employees and must be paid on the American scale.

Cooke of American Cyanamid
"Combining recruiting with idea-scouting just alienates your contacts."

Still another technique employed by companies with many overseas interests, such as Burroughs Corp., is to use all foreign-based technical people as part-

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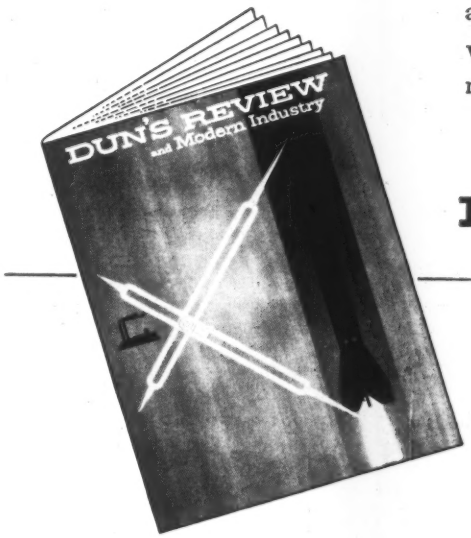

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"The Common Market will make European and American technical objectives more alike."

time observers. The restriction here is that when a good deal is spotted, the part-time observer may not be free to follow it up.

Not all experienced executives are in favor of technical observers. Dr. Leslie K. Gulton, president of a comparatively small manufacturing company, Gulton Industries, Inc., Metuchen, N.J., derides the practice. He declares that a company executive can accomplish more in six weeks than a highly trained technical man can in six months, because an executive appreciates marketing problems. However, Dr. Gulton is in a better position to trade for overseas technology than most Americans. He is European-born and has run companies overseas.

Hiring a full-time observer is an expensive proposition. His salary ranges from $12,000 to $22,000 a year, and the tab can go as high as $50,000 a year if it covers travel, office space, secretarial help, and semi-annual liaison trips to the United States.

However, the returns can more than offset the costs. For instance, one American drug company is understood to be grossing $40 million a year on a tranquilizer formula imported from France.

Rating the candidates

Experienced executives recommend picking a man out of the ranks who knows the company objectives. Some executives feel that foreign-born observers with long residence in the United States are the best candidates. But others say a multi-lingual American is better equipped because he has no stake in European rivalries.

For the small company that can't afford to send or keep a man overseas, or for the large company that wishes to supplement its other foreign sources, subscribing to one of the overseas technical observation services is a good idea. Armour Research Foundation in Chicago formally organized the first such service in 1956. Operating from a base in The Hague, five trained professional men cover all of Europe. Direct contact between the fifteen to twenty noncompeting subscribers and the observers insures high efficiency. The observers also visit the United States twice a year to check on client needs. Cost to each subscriber is $9,000 a year, which is about what Stanford (California) Research Institute charges for a similar service. One American company gained so much useful technology this way that it dropped its subscription temporarily in order to digest all the material it had acquired.

Foster D. Snell, Inc., New York, has just announced a roughly comparable service. Snell, in association with consultant Robert S. First, offers an exclusive, comprehensive report to subscribers, but less restricted reports are available at lower cost. Aries Associates, Stamford, Conn., also makes European technical surveys for customers. Similar services may be set up by other research organizations. None of these organizations acts as intermediaries for licenses.

Originating R&D overseas

An intriguing alternative to buying the results of overseas research and development is originating R&D projects at foreign labs, especially if they can be paid with blocked dollars. Several research organizations and institutes are involved in this type of program. A. D. Little, Inc., Cambridge, Mass., has established a laboratory near the University of Edinburgh for this purpose. And Battelle Memorial Institute, Columbus, Ohio, has placed a few contracts for American companies at its European laboratories, although their main purpose is to serve European industries. Franco-American Research Corp., New York, and Aries Associates have also acted as brokers in placing some contracts overseas for some companies.

All of these organizations emphasize that the main reasons for having R&D performed overseas are that comparable American talent is tied up or nonexistent, a fresh line of attack is needed, or the top man in the field is less likely to be tied to a company lab. The fact that out-of-pocket expenses are about 50 per cent under American industrial research rates should not be a consideration. Both Dr. Leland M. White, director of research, U.S. Rubber Company, and Dr. R. W. McNamee, manager of research administration, Union Carbide Corp., assert that this reduced cost is sometimes offset by added communication costs and the effects of possibly poorer communications.

continued on page 126

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Gulton of Gulton Industries

"Any time is a good time to start looking for technology overseas."

Where to look

Experienced executives do not agree on any one area which offers the best opportunities for idea prospecting. But, generally, they rank Germany and Great Britain on a par, technologically, and list France, the Lowlands, Italy, Japan ("a real comer"), Sweden, and Austria just behind them in that order. However, within each of these countries there exist individuals, companies, and laboratories that are the equal of any in the world. For example, there are excellent labs in Austria that are eager to do business.

The six-nation European Common Market, established last month, will tend to erase national technical specialization in Europe and greatly expand production, making the search for technology overseas even more worthwhile.

Merging objectives

At the same time, European technical objectives should come closer to ours, points out George P. Kovach, director of research, Foster Grant Company, Leominster, Mass. Already, larger production units are being formed by mergers within the ECM but across national borders. As a result, trading or licensing overseas technology will be more efficient, and it will be less necessary to extrapolate or redesign a European product or a process and its associated equipment up to American dimensions.

European industry's interest in automation, mechanization, and labor-saving devices also should be intensified, says Dr. E. W. Cooke, American Cyanamid's chief idea scout in Europe.

Companies active in this special phase of international trade have encountered several obstacles. One is the fact that most foreign interests want a whopping initial "earnest" payment, and a high royalty—without offering exclusivity.

American companies, on the other hand, are leery of buying a pig in a poke. They prefer to pay a reasonable royalty on an exclusive basis (at least within the United States). If the development pays off, it should return to the source a handsome income based on high sales.

More payment problems

The compromise that frequently results, after months or years of periodic meetings around the conference table, calls for an annual advance against royalties (to insure activity on the part of the American licensee), with royalties often running as high as 5, 6, and 7 per cent of gross sales. The size of the royalty is closely tied into the question of exclusivity.

There is another impediment to negotiating with foreigners. At least three foreign governments, France, Great Britain, and Japan, must approve all contracts between nationals and outsiders relating to licenses or exchanges of technology. Some American executives have been disconcerted to see weeks of costly but fruitful negotiations negated by an official stamp of disapproval. In general, there is less interference in hard-currency countries.

Hobson of United Fruit

"Research costs in Europe run from 25 to 50 per cent of comparable American rates."

As overseas technology (exclusive of Russia) approaches the extent of American technology, the natural effect will be more trading than purchase of technology. If both participants are equally strong and well diversified, it is much more sensible to set up a long-term trading agreement than a one-shot monetary deal. Already most of the negotiations over technology between giant American corporations and their foreign counterparts are on a trading basis.

Moreover, some smaller companies are following suit. For example, an American manufacturer of automatic electronic controls wanted to balance its line with a series of mechanical con-

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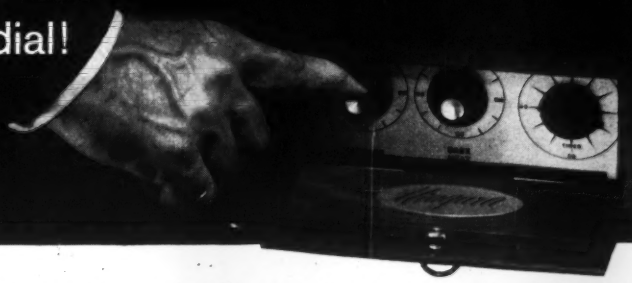

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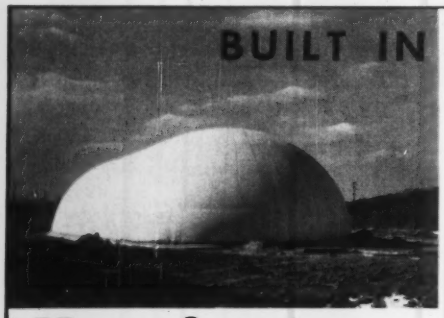

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trols. Instead of taking years to develop and engineer the new line, it sought out a non-competing German maker of mechanical controls. A technology trading agreement was consummated under which both companies turned over complete sets of blueprints to the other. Each is to continue to inform the other of any new improvements. At practically negligible cost, each company is able to market in its own country a proven line of equipment.

How idea-swapping works

In general, companies in hard-currency countries are more prone to trading deals, while companies in soft-currency areas prefer the American dollar —under the urging of their respective governments.

American trade associations are also getting into the act. The Truck Body & Equipment Association of America has set up a program of free exchange of technical information with its French counterpart.

A few American companies are even going beyond trading. To exploit some new overseas development, they are setting up joint American companies with the foreign originator. Mobay Chemical Company, Pittsburgh, is a good example. It was jointly set up in 1954 by America's Monsanto Chemical Company and Farbenfabriken-Bayer, A.G., of Germany to make versatile urethane plastic.

Although many American companies are hiring outstanding foreign technical men, experienced executives warn against trying to combine recruiting with idea-scouting or license negotiations. If overseas companies and universities think an American visitor is trying to shanghai their best men, they will refuse to swap ideas or enter into any other kind of negotiations with him,

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says Richard D. Coveney, vice president of A. D. Little.

In addition, once a foreigner comes to work in this country, he no longer has an intimate knowledge of what projects are under way in his native land and may even lose his more analytical, mathematical way of approaching problems, one of the worthwhile reasons for hiring him in the first place, says Dr. Jesse E. Hobson, vice president and director of research, United Fruit Company, Boston.

An efficient but expensive way of hiring foreign professionals and still preserving their distinctive outlook is to establish them in a lab on their own soil. Three American companies, RCA, Monsanto, and IBM, have labs in Zurich, while two companies support labs in the Low Countries, but do not officially acknowledge the relationship. Smith, Kline & French is now building a new research laboratory in Great Britain. The IBM lab is the largest, with more than 25 professionals, according to Dr. E. R. Piore, IBM's director of research.

Although these overseas labs generally are set up by giant corporations, one of them is supported by an equipment manufacturer that grosses less than $10 million a year.

Payoff from overseas labs

Overseas labs offer many advantages to American companies:

- They provide work and spend money in countries in which the parent company may do business.
- They could, within the ECM, support local manufacturing operations if American companies are forced to establish them in the face of potentially higher tariffs.
- Where income is gained overseas through local manufacturing operations, sales of goods or services, or licensing deals, they are a way of building equity instead of paying high tariffs or waiting for the money to be released.
- Staff members can also double as technical observers or be brought here to act as short-term consultants.

Considering the high failure rate of R&D projects and the often sluggish pace of product or process development, management, as a means of diversifying or outdistancing competition, is not overlooking any opportunity to buy pay-off technology overseas, rather than developing it at home. Although some industrialists have avoided importing such technology or stamped "top secret" on all overseas deals, alert and progressive managements actually publicize their extensive foreign observation and licensing activities. Just as it is socially fashionable today to buy foreign cars, it is now economically fashionable, if not vital, to import foreign technology.

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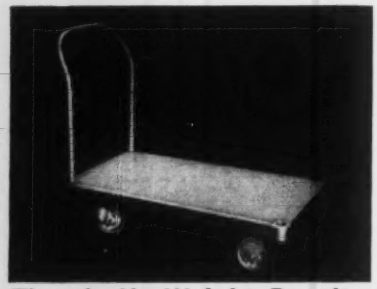

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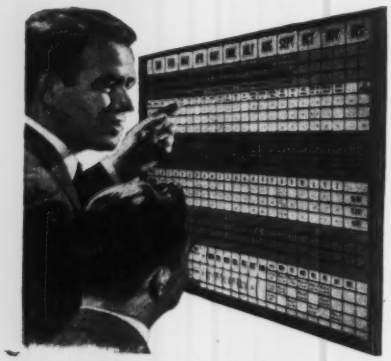

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WHAT'S HAPPENING TO SELLING TERMS?

continued from page 51

Before 1900, the reasons for change in selling terms were primarily financial. Vendors shortened their terms and began to offer cash discounts to speed collections and, notably, to reduce credit losses. The latter seems to be the least of the influences affecting present day changes in terms.

Terms for all occasions

The fact is that in modern times the tendency has been for terms to change in all directions. Some vendors have reduced cash discounts to reduce costs of doing business, while simultaneously granting longer terms to attract customers. At the same time, others have increased cash discounts to attract customers, while granting shorter terms to speed collections and thereby cut down on the cost of borrowing money. Very frequently, the squeeze between rising costs and falling profit margins has done more to motivate changes in terms than has credit policy. Still other vendors have been driven to change terms simply to meet the sales competition of those who changed their terms. Included in this last category are concerns which have reduced cash discounts in lieu of increasing their selling prices, while lengthening net terms as a form of financial assistance to their customers.

Into today's pattern of confusion and bewilderment enters yet another element, namely, that customers have frequently taken the bit in their teeth and more or less dictated the terms under which they would pay, regardless of stated terms. Another element of confusion emerges in that suppliers often are not in agreement with their customers, or for that matter, with each other, as to how a particular set of terms is to be interpreted. The fact that suppliers often deviate from their stated terms in administering the terms adds one final note of confusion.

A backward glance through history shows how all this came about. During the 18th and 19th centuries, credit and credit terms were dominated by an expanding frontier. In the colonial era, for instance, importer-wholesalers located in the important trading centers along the Atlantic Coast sold merchandise to country stores and traders pushing inland. The ordinary terms of sale called for payment in from six to twelve months, but accounts were often balanced only at the end of extended periods, which often ran on from year to year. Creditors were frequently more worried about whether they would be paid than about how long they would have to wait for payment. Shopkeepers were, because of lack of ready cash, frequently willing to pay a premium for extra time to pay.

In those days, every sale was a horse trade. By the turn of the 19th century, conditions had stabilized enough to cause terms to shorten somewhat. Terms from 1800 to the beginning of the Civil War ranged from six to eight months.

This did not mean there were no risks involved. On the contrary, to the normal hazards in an unsettled country were added the recurring panics arising from speculation and an uncertain monetary currency. Losses were heavy, and there was a high percentage of business failures.

How cash discounts emerged

It is difficult to pinpoint exactly when the practice of offering cash discounts first came into being. A fairly accurate guess is that, sometime between 1820 and 1840, suppliers began to give varying discounts of up to "5 per cent off" for "cash payment," which in those days often meant payment within ten to 30 days.

In any event, terms shortened noticeably during the Civil War. By the end of that war, suppliers frequently sold on short terms of 30 and 60 days, although 4 per cent discounts and four months net terms also were quoted.

From 1865 to 1879, credit conditions were greatly disturbed by uncertainties over the value of currency. But when the veil was lifted in 1879 by currency stabilization, the modern-day development of formal selling terms began. Not too much information is available as to what happened to selling terms between 1880 and 1910. But this much is known—there appears to have been a great variety of discounts and terms. Before 1900, for instance, manufacturers of iron and steel were granting credit discounts as high as 10 per cent. Cash discounts of 5 per cent and net terms of up to 180 days were not unusual.

But from 1910 to 1920, there were forces working toward uniformity. The principal forces were trade associations. Their efforts are described in considerable detail by Dr. W. H. Steiner, whose book *The Mechanism of Commercial Credit*, published in 1922, is regarded as one of the finest volumes on credit terms and practices ever published.

Steiner, in describing the development of terms in 43 basic industries, credits sixteen national trade associations with taking specific actions in the form of resolutions and recommendations offered at their conventions which resulted in greater uniformity of terms for those industries.

This trade association activity was

halted, however, by two Federal regulatory agencies. One was the Anti-Trust Division of the U.S. Department of Justice. The other was the Federal Trade Commission. Between 1920 and 1933, there was a surge of cases involving prosecution of trade associations for price-fixing. Since 1940, a rash of "cease and desist" orders have been issued with great vigor by the Federal Trade Commission under the Federal Trade Commission Act and the Robinson-Patman Act.

Because the Federal Government regards with great suspicion any attempt to promote uniformity of selling terms in industry, the entire initiative for setting terms of sale rests with the individual business man. He literally has been forced to make his decisions alone. And this, in turn, accounts not only for the great variety of selling terms existing today, but also for the ever present condition of change in modern-day selling terms.

Nevertheless, some trend toward uniformity has taken place. When Steiner wrote his book almost 40 years ago, he made an industry-by-industry tabulation of prevailing terms in 232 industries. He found that as communications developed and transportation systems cut down on the time element in ordering and receiving goods, and as the financial and industrial system of the country grew in strength, credit terms had been shortened from twelve months or more common in the 1700's to 30 and 60 days, and inducements for prompt payment had been reduced accordingly.

Today's discount picture

The DUN & BRADSTREET study of prevailing terms and practices among manufacturers and wholesalers shows how this principle has evolved since 1920. Disregarding the 33 per cent of those concerns using two or more sets of selling terms, the survey found these discounts granted by the following percentage of business concerns who confine themselves to one set of terms:

- no discount granted, 32 per cent
- ½ per cent discount, 6 per cent
- 1 per cent discount, 19 per cent
- 2 per cent discount, 38 per cent
- all others, 5 per cent

In the "all others" industries are a variety of discounts, such as 3 per cent in costume jewelry, 4 and 5 per cent in carpets and rugs, 6 and 7 per cent in certain types of men's furnishings, notably neckwear, and 8 per cent in women's apparel.

As for the period of time in which customers are allowed to earn cash discounts, the periods are generally ten days, 10th of the following month, and 10th and 25th. The table on page 51 gives the complete picture.

The practices under which net terms are administered when no cash discount is offered by vendors, or when, where offered, it is not earned, are shown in detail in the table on page 51.

It is important here to investigate the influences that are causing terms to change and some of the predominant trends.

A Midwestern manufacturer of abrasives replying to the survey writes as follows:

> We have a strong feeling that in a hard and tight money market, cash payments should be emphasized, and in an easy money market cash terms should be deemphasized. We sincerely believe that in an easy money market our terms of discounts should be reduced from 2 per cent to 1 per cent. We tried that once in the face of competition, but the pressures were so great that we had to revert to 2 per cent. However, we see no rhyme or reason in granting the same terms for cash payments in the two different types of money markets.

This, on the surface, seems reasonable enough. Students of credit have long recognized that the patterns of credit terms tend to change in accordance with competitive influences. And, inasmuch as the American economy has been increasingly competitive since 1953, it would be reasonable to assume that terms have eased with a certain uniformity in most lines of industry.

No uniform change

Terms, indeed, have tended to change since 1953, but there is striking evidence that the change has been anything but uniform. In fact, it would seem that, like Leacock's famous horseman, they have galloped off in all directions simultaneously.

The DUN & BRADSTREET sampling of business concerns shows that 257 companies, or 16 per cent, have changed their terms within the past five years. It also appears that the number of those who made changes increased every year: In 1953, the number was 13; in 1954, it was 32; in 1955, 39; in 1956, 57; in 1957, 72; and in 1958 (for the first three months of the year), 18.

By projecting the results of this representative, random, country-wide cross section survey to the 600,000 manufacturers and wholesalers listed in the DUN & BRADSTREET *Reference Book*, it can be estimated that nearly 100,000 concerns, or roughly 16 per cent of those listed, changed their selling terms, wholly or in part, between 1953 and 1958.

The survey also shows that the number who changed their terms in 1957 was five and one-half times larger than the number whose terms changed in the year 1953. And projecting from the figure for the first quarter of the year, more concerns changed their terms in 1958 than in the previous year.

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The nature of the changes in terms reported by this cross section is even more striking than the number of changes. They fall within three main categories: the size of discounts granted, the amount of time granted under regular terms, and the amount of time granted under datings. The table below shows how the 257 concerns changed their terms.

In brief, what this tabulation indicates is that, for every three concerns which granted higher cash discount, there are four which reduced or eliminated cash discount. Twice as many concerns granted longer regular terms than shorter regular terms. But, if the number of concerns which accommodated customers by granting more time in the form of datings is also considered, then three times as many concerns granted more time than granted less time in which their customers could pay their bills.

HOW 257 BUSINESSES CHANGED THEIR SELLING TERMS BETWEEN 1953 AND 1958

	Manufacturers	Wholesalers	Total
Cash discount increased	48	14	62
Cash discount reduced or eliminated	64	17	81
Longer regular terms	42	14	56
Shorter regular terms	16	12	28
Longer season datings	20	7	27
Shorter season datings	3	0	3

The story behind the data

The reasons behind these changes also were brought out in the survey. About half the 62 concerns, or nearly 4 per cent of the sample, who increased cash discounts say they did so to meet concessions offered by competitors. The remainder did so as a means of speeding up collections.

The 81 concerns, or 5 per cent of the respondents, who lowered the amount of the cash discount include 34 who eliminated cash discounts entirely. Of these 81 concerns, 24 say they reduced or eliminated discounts because they were tired of coping with unearned discounts. Another twenty state simply that they could not afford to continue former discounts—their margin of profit was too low. Another twelve say they were conforming to the general practices adopted by others in the trade. Eight report that their own suppliers had cut down on discounts, and eight say they reduced discounts as a substitute for a cut in their selling prices. The remaining nine respondents gave various other reasons.

Interestingly, as many concerns reduced their discounts because of discount violations—i.e., taking unearned discounts while past due—as who increased the size of their discounts to speed collections.

The effectiveness of the cash discount as a collection tool has been the subject of heated contention among credit men for nearly 50 years.

Among the 34 concerns which reduced or eliminated cash discounts, four report that lower cash discounts were followed by slower collections. One went from 25 days to 34 days, a second from twenty days to 40 days. The other two had not yet made a precise analysis. Of the remaining 30 concerns, 29 say they have not noticed any appreciable difference in collections. The thirtieth concern reports it has actually improved its collection period by 15 days, without any noticeable difference in sales.

Some provocative comments on discount practices come from this group of respondents. Says one: "We believe, because of the great amount of machine bookkeeping, that when a customer pays once, twice, or three times a month, your bills get paid depending on when they come in and when the customer's office machines are set to make payments. We believe this is the reason that our collections have not been stretched out, in spite of elimination of cash discount."

Another states, "Customers who have a regular payment procedure still pay us on that basis, regardless of discount."

And a third adds: "Only a few of our customers were taking advantage of discount. These were the prompt-paying and volume customers. The others continue to pay at their normal pace."

Discounts and their size are matters for individual credit grantors to decide for themselves, and such decisions must be based on factors such as prevailing trade practices, margins of profit, and turnover of receivables. But the following comment from a respondent seems most provocative:

"When a cash discount is allowed, it must be considered in the price structure and the cost of doing business. The question of granting a discount must be resolved by deciding whether or not this expense is offset by the amount of money recovered through early payment encouraged by the granting of a cash discount."

Time is a concession which many credit grantors have been offering to customers. Two per cent of the survey respondents report they have cut back on the amount of time granted to customers under regular terms, while 5 per cent are allowing customers more time to pay under regular terms or seasonal datings. In addition, 40 per cent of all respondents acknowledge that at one time or another they have granted special terms involving longer terms than usual to customers.

Longer terms vs. shorter terms

Eighty per cent of those who report granting longer terms did so either to meet competition or because of pressures imposed by customers. In other words, time is used as a selling tool in terms of sale, particularly in a tight money market. This, in turn, poses a dilemma for suppliers. On one hand, they are pressed to maintain prompt collections, while on the other they must increase sales in a period of rising plant capacity and falling profit margins.

The large and well-financed vendors have been able to take these things in stride or at least to adapt themselves to the necessary adjustments. But the smaller and less well-financed suppliers have voiced painful complaints about the easing of selling terms. Frequently, the small supplier is caught in a squeeze between shortened terms and reduced cash discounts offered by his own suppliers and the clamoring of his own customers for more liberal terms. At the same time, the small supplier suffers because of the strong bargaining position of the large and important buyer.

It is a harsh predicament. The small supplier cannot band together with others in his industry to establish uniform terms without running afoul of the law, for the authorities define this as "unfair competition." He is bitterly critical of the actions of his larger and more strongly financed competitors who take business away from him by offering credit terms which, because of his capital limitations, he cannot meet. END

A comprehensive treatment of this subject has been published as an 86-page brochure, Current Trends in Terms of Sale, *by Roy A. Foulke, Vice President of Dun & Bradstreet, Inc. Copies are available at $1 each from Department 11, Dun & Bradstreet, Inc., 99 Church Street, New York 8, N.Y. The author of this article, Mr. Sanzo, participated in the research of the brochure.*

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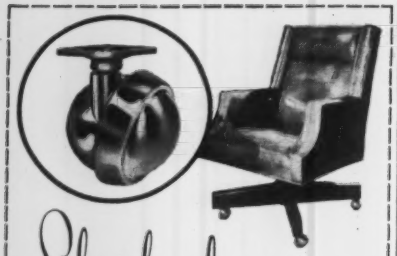

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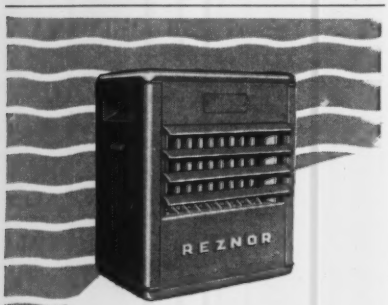

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The Reviewing Stand

Does the "organization man" — the brainwashed robot of management—really exist, or is he, like the "average man," only a statistic? In our March issue, senior editor Kenneth Henry reports on how the presidents of some of the largest American industrial companies, members of DR&MI's Presidents' Panel, evaluate the reality and fiction that compose this twentieth-century stereotype. The relative merits of individualism and conformity in management receive a careful analysis by these chief executives, and one conclusion becomes apparent: At the top, the complete maverick and the conformist who functions by rote and directive are equally rare.

Some presidents see the need for both the self-starting, self-propelling executive who takes risks and makes mistakes, and the routine specialist who follows orders, consumes or destroys mountains of detail, and serves as the eyes and ears of management. The area of decision and the nature of the product have an equal bearing on the choice of an individualist vs. a conformist. Several presidents expect those qualities to be combined in the same person, but not necessarily in balance. A number of presidents decry the "me too" attitude of the opportunist executive who merely follows the leader, hoping to be included as a toadying "insider."

"Are you going into business or politics?" There was a time when only an unusually brave young man, asked this question on the threshold of his career, would answer, "Both." For a generation, business men have relied on trade associations, chambers of commerce, and company lawyers to protect their interests and guide them through the maze of regulatory laws, tariffs, and taxes. But the time has come when the business man feels the need, as well as the responsibility, to be a participating-citizen rather than a not-so-innocent bystander in the selection of office holders and the framing of legislation. And the best way he can participate is as an individual voter or candidate, not as a committee. Some of this new interest in politics has been aroused by the business man's desire to counterbalance the importance labor union support has had in the choice of candidates. However, several larger companies have moved away from this narrow, protective attitude, and have set up positive educational programs to alert their executives and employees to the broader problems of government and the responsibility of the citizen. Faye Henle considers these new political action programs in an early issue of DR&MI, weighs their relative merits, and examines their ethical and moral justification.

In today's competitive struggle for retail sales, two forces stand out—the discount house and the trading stamp. Just a year ago, Aaron Sternfield presented in a DR&MI article the pros and cons, as well as the legal implications, of the discount gimmick as it affects fair trade merchandise. In the March issue of DR&MI, Mr. Sternfield considers the merits and limitations of the trading stamp as a sales promotion device.

More than a half-billion dollars worth of stamps were sold to retailers in 1958. Retailers, strangely enough, are more inclined to use the stamp gimmick in good times than in bad. Mr. Sternfield reports how the device is used and what its advantages and drawbacks are for the retailer and the customer.

Soviet Deputy Premier Mikoyan, with all the agility, vitality, and astuteness of an Armenian rug merchant, has given American industry, distribution, and community life a rapid once-over. When asked how soon Russian factories would provide workers with parking lots like those adjacent to American mills, Mikoyan replied in candor, "Not for many years ahead." The leader of a nation whose scientists have placed a satellite in orbit around the sun knows that it is comparatively easier to launch a rocket than to build and maintain a highway system which would be adequate to the needs of Russia's far-flung industrial, mining, and agricultural communities and enable her citizens to circulate with the freedom of an American worker. As Mikoyan knows, it's a long way from Leningrad to Harbin in Manchuria, or from Archangel to anywhere, and no nation is any stronger than its transport and communication systems. Incidentally, new efforts to strengthen the American transportation system will be surveyed in a Special Report to Management on transportation techniques to appear in the June issue of DR&MI.

One common factor stands out vividly in the wealth of information on plant financing, design, and location gathered by DR&MI editors for the March Special Report on "Planning Tomorrow's Plants." It is a simple fact that a company cannot run away from an unfavorable situation when the fault is inherent in management itself. This applies to labor problems, to sales and warehousing, to local taxation or facilities. Bad management takes its troubles along wherever it goes, and it had better look inward for a change for the better before its looks elsewhere for improvement. —A.M.S.

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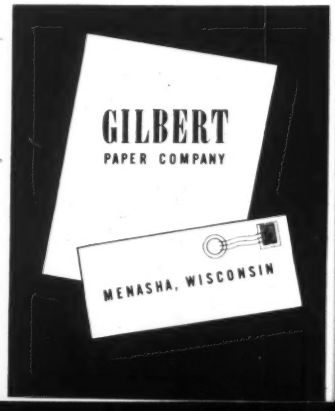
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